

# FAIRMOUNT WATER WORKS FOREBAY FEASIBILITY STUDY

MARIANNA THOMAS ARCHITECTS



HISTORICAL CONSULTANT: CLIO GROUP, INC.

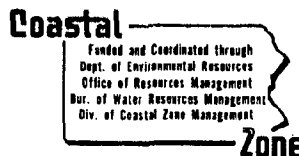
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**FAIRMOUNT WATER WORKS  
FOREBAY FEASIBILITY STUDY**

prepared for

**THE WATER DEPARTMENT, CITY OF PHILADELPHIA**

Funded and Coordinated through the  
Pennsylvania Department of Environmental Resources  
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# I. INTRODUCTION

## INTRODUCTION

For nearly two centuries the Fairmount Water Works has been among the most valued of Philadelphia's treasures, the result of the nearly perfect joining of nature and manmade structures to serve the physical, intellectual, and spiritual needs of the city's residents. Though it is no longer operational, it recalls the time when it was the nation's first large scale waterworks, a factual expression of the willingness of Philadelphians to undertake great projects and to take great risks to overcome great crises. Its classicizing architecture bespoke Philadelphia's ambition to be perceived as the "Athens of America," not merely a place of classical buildings but a center of culture and civilization. For nearly half of its history the waterworks continued to evolve as technology changed, giving it significance in the history of engineering and technology. In those years the buildings and landscape came to be enjoyed as a place of recreation, outside the limits of the city and removed from the pressures of man's enterprise. Indeed, though it was a product of the beginning of the industrial revolution, it could be argued that it was also a response to the pressures which the Industrial Revolution created, necessitating recreation, and the return to nature.

Thus, though the Water Works is rooted in the problem of and the technological solution to the provision of water to the city, for most of its history it has been at least as much a promenade, a place for a beverage and a light lunch or dinner, a place for fishing and listening to and watching the flow of the river. A century after the Water Works were made redundant, it is as a place of recreation that the site will continue to find its use. It will be more successful if the original cornucopia of uses of the nineteenth century are restored. In the twentieth century, Americans have different recreational expectations. No longer do we find time for the simple pleasures of a stroll for two or three hours, augmented by a meal. We drive to dinner, spend a few moments looking at the scenery, view it uncomprehendingly and leave for the words and images of television.

Without uses and users, city sites are doomed to decay and destruction. The Water Works must find a means by which its buildings and places are operated profitably, sustaining its care while keeping the buildings and landscape in the public eye. In our society, food has become a major source of recreation; given the addition of an interpretive center, and the possibilities for use of portions of the site for special events, the potential for a permanent facility is eminently realizable.

### Restoration or Adaptation

While the purpose of the site has been defined, the character of the site requires collaborative thought. Because of the obvious importance of the surviving artifacts, the Historic Structures Report and most of the reviewers have presumed that restoration would be the fundamental approach. There is no doubt that it is the basic direction that must be taken. Still, the realities of the changes to the site cannot be overlooked. The site is no longer a waterworks, but is instead a garden and fishing pier with various sculptures and small buildings dating primarily from before 1871. Presently it lacks the major landscape water feature of the forebay with its vast roar of water racing through turbines, but it is also missing the sculptural and architectural elements of the distribution arch and the standpipe, while the reservoir basins have been replaced by the great base of the museum.

Despite the impact of those changes, the basic characteristics of the site, small buildings from the

beginnings of the industrial age in the midst of gardens along a river bank, would have been explicable and generally consistent to a modern viewer. They were fundamentally changed in their meaning by the addition to the site in the 1920s of the Philadelphia Museum of Art which controls the approach and dominates the skyline, leaving the ancient buildings as little more than the base for the vast mass of the museum. More than just the backdrop has been altered, however, for the East River Drive is no longer a slow moving carriage-way but rather a high-speed highway that separates the Water Works from the remainder of its site. In the nineteenth century, most visitors strolled the river banks, walked up to the boathouses, and completed the afternoon with a visit to Lemon Hill which was as well known an eatery in the Park, as Valley Green is now. Even if those elements had not changed, the immediate site of the waterworks has been altered by roadways which have obliterated gardens in order to provide access to the Water Works buildings when they served as an aquarium and pool.

The result is that it is quite impossible to do an absolute restoration to a target date of 1871 or 1911 or any other period. At best the goal might merely be stated as the stabilization and adaptive re-use of the existing structures and setting. Modifications of the site to enhance the proposed immediate use should aim for the maximum level of protection for the site for future work. If so limited a perspective were taken the site would be doomed to continue as a fragmented site secondary to its more monumental neighbor on the heights. It is our belief that the special character of the Water Works deserves more attention.

To that end we have examined the site in terms of its potential for restoration and propose the following zones and hierarchies:

1. The Water Works buildings: the engine house, the mill house, and the wing dam - the pre-1875 site.

These are the central buildings of the Water Works experience, defining its uniqueness by style, color, and architectural character, and providing the quintessential stage that unites river and public. Their public character must survive - fortunately history demonstrates that the engine house, after being made redundant by the turbines, served as a saloon and public place of entertainment. Private use and public access have never been mutually exclusive. Here, at this site, they have been closely connected for a century and a half. Nor are we particularly impressed with the necessity to adhere strictly to a single moment of significance - which can not be obtained without extensive reconstruction of missing architectural and landscape elements - unless the 1920s after the construction of the Museum and the abandonment of the Water Works function were made the period of restoration. We are largely content with what is - so long as it is generally understandable, believing that the historical experience will be an important draw in an ever more artificial world.

2. Parterre landscape south of the Water Works - the 1870s tableau.

From the second quarter of the nineteenth century, the Water Works was landscaped and embellished by sculptures and fountains as an expression of the public character of the site and as the setting for this important utility. Much of that landscape has been swept away in a century of change, notably the upper reservoirs and approaches now occupied by the Museum and the Reilly Memorial. More notable is the immense change in the meaning of the site that occurred with the extension of the Parkway into the region below the Museum. The circle on East River Drive was connected by a diagonal to a second circle on axis with the Museum. There a "Trivium" or triple array of streets/ vistas were laid out, one the

Reilly Memorial, another an eastern axis, while the third became Aquarium Drive in front of the Water Works. Though it links the earlier site to the modern plan it also subordinates it, as a side light off the main axis. These both change the character of the Water Works entrance while reducing the original landscape to a lost and nearly meaningless feature.

The potential of the Water Works site is of course very different. The dramatic rough stone walls and ravines of the Fairmount and the riverbank enclose a space which once was a handsome formal landscape, conceived in the earliest years of the site and in accord with the fundamental character of the buildings. Its small parterre dotted with architectural fountains and memorials, and arranged with gravel paths and plantings of the Gardenesque sort, were appropriate to the character of Graff's late Federal designs. For a time it was entered both from the water works end and from a plaza at the base of the old Spring Garden Street Bridge, an idea which survived in the steps down from the bridge of the 1870s. Taken together with the natural cliff and the modest elements of the early buildings, these gardens form an elegant small-scale Victorian tableau that should confront the approaching user from the north and east.

The opposite end of the site was dominated by the great moving sheet of water of the forebay which filled from the back side of the mill house to the the far side of the present drive, reaching to the base of the stone cliffs. Spanned by a bridge which gave access it provided a dynamic counterpart to the static parterre. Water appeared elsewhere as well in tall water-jets. Thus water was the feature which emphasized that this was a waterworks, and not just another garden.

In view of the importance of the historic site, it is particularly important that water eventually be reintroduced into the forebay, but even without it, a landscaped treatment of the lower level of ground and the restoration of the bridge and south garden will go far towards a sympathetic setting. At every turn, the landscape along the river edge should be turned towards the chosen 1870s period of significance, particularly linking the waterworks and the boathouses. Perhaps, even though it would not be pure restoration, it would be wise to add lighting of the sort used on the boathouses to link these two small scale Victorian sites, thus taking advantage of a modern Philadelphia favorite feature and differentiating the Water Works from the glowing wall illumination of the Musuem above.

### 3. The Museum, and Reilly Memorial- 1920s Beaux-Arts Formalism

The distant and most familiar views from the Spring Garden Bridge, and the West River Drive by contrast are a creation of the twentieth century. The Museum is a building of immense size, with vast, unarticulated wall surfaces, gargantuan columns and pediments and linked to a landscape that reach all the way to City Hall. In and of itself it transformed the character of the site because it caused the removal of the original reservoirs and architectural features. But the Museum also transformed its immediate topography, spreading out areas of parking and adding the Reilly Memorial ramp down to the Water Works. This introduced a spatial axis which diverts the attention of the visitor from the Water Works to the Museum.

The Museum need not completely overwhelm the Water Works, for as noted above it has its own distinct landscape that deserves celebration and emphasis. Ordinarily contemporary preservation practice would call for the preservation of the modern Cret-Greber landscape. We would argue because of their grossly different scale and character that the two zones should be kept separate and distinct. Moreover, because of major changes in the Cret-Greber plan, notably in the closing off of the axis

through the azalea garden, and the intention of restoring the historic bridge to the millhouse, it is no longer essential to maintain all elements of the 1920s plan. Because it is intended that the Water Works zone be given its own distinct character, the entrance to the site off the 1928 Seahorse Fountain circle should be given a distinct character different from the Reilly axis. Wherever the sites come together, their connections should be purposeful and distinct. The design should look carefully at the intentions and architectural vocabulary of the 1920s designers for lighting, railings, and other details to avoid blurring the distinction between the two disparate sections.

#### 4. The modern road access, drives and connections - the 1990s

The present project offers several possible options which, plainly stated, might be summarized as first, restoration of and use of features from a single period of significance to try to create a convincing though in fact artificial setting, second, a modern 1990s design in keeping with the historic character of the site that would represent the continuing adaptation of the site by Philadelphians, or finally a combination of the above approaches. Each has much to support it; the first perhaps gives the site a consistent and therefore perceivably historic character and feeling which might be extended even to costuming the restaurant staff. The second acknowledges the true state of affairs and would require the least disruption while playing on the creative tension between the present and the past. The third approach might take its vertical detail from the 1870s while recalling lost features in modern materials in paving. In any case, this work should be designed in such a way as to permit future restoration as funds and information permitted while simultaneously adding features that might emphasize the new uses and function of the site.

#### Recommendations for Periods of Significance

In accordance with previous decisions, the 1871 condition was assumed as the period of significance for the buildings, as established in the Adaptive Reuse Feasibility Study, prepared in 1981 by John Milner Associates. By that date, the deck of the Old Mill House had been elevated to its present level for incorporation of the large new turbines and the Pavillion and the Entrance Houses added atop the deck. While the authors of the Milner study recognized the aesthetic and interpretive desirability of a unified period of significance for the site, they proposed a later date, after infill of the Forebay, for flexibility of planning for reuse of the site. They felt that the 1920s basis, after construction of Aquarium Drive, would facilitate pedestrian and vehicular circulation, access for service and fire protection equipment. But, because of major changes that have occurred in the Cret-Greber plan of radiating avenues, and because of the desire to emphasize the Water Works, the landscape component of the site should be significantly reinterpreted. This will enable the site to work in its proposed public use as a restaurant and Interpretive Center while also differentiating it from the Museum zone above. The intermediate zone of the Forebay offers an opportunity for resolution of the dialectic between the 1870s Water Works site and adjoining 20th century landscape elements. Development of a philosophical and aesthetic approach to treatment of the Forebay lies at the heart of the site's interpretation and the design challenge.

## Methodology

Development of consistent accurate base documentation proved to be a challenge. Project services started with a search for historic drawings to augment the measured plans, sections and elevations prepared by HAER, the utility plans and historic photographs provided by the Water Department. Through field visits and careful comparison of the documentation with the photogrammetric site plan prepared for the Fairmount Park Commission, the outlines of the missing and altered features were located and base drawings were prepared. To enhance our 3-dimensional understanding of grades and water levels at different phases of the site's development, construction of a scale site model was begun immediately.

Programmatic information on planned uses of the site was drawn from numerous sources. The description of the exhibits proposed by the Water Department for the spaces below the Engine House and South Entrance Building was taken from Matheu Cebul and Associates, Design for an Interpretive Center at the Fairmount Waterworks, Final Report, June 30, 1986. Alternative uses considered for other buildings were reviewed in John Milner Associates, Adaptive Reuse Feasibility Study for the Fairmount Waterworks, September, 1981. Sketch plans of the proposed restaurant occupancy of the Old Mill House and Engine House were provided by representatives of the Fairmount Park Commission who were involved at the time in the negotiation of a potential lease for such use.

The primary sources of programmatic data, however, were the participants in the 15 year process of planning the restoration and adaptive reuse of the Water Works. A questionnaire was prepared at the start of the project and circulated to representatives of the Water Department, the Fairmount Park Commission, the Philadelphia Historical Commission, the Philadelphia Art Museum, the Junior League and consultants involved with aspects of the process. Their responses provided us with a rich combination of factual background, planning history and aspirations. Finally, our review of the original and changing uses of the site included key contemporary 19th century accounts, as well as such secondary sources as the National Landmark nomination and Jane M. Gibson, "The Fairmount Waterworks," Bulletin, Vol. 84, nos. 360, 361 (Philadelphia: Philadelphia Art Museum, summer, 1988.)

Our interdisciplinary team approach to the design problem involved visits to the site by the entire team and several brain-storming sessions. In the search for compatibility of site interpretations goals, historic preservation criteria and proposed adaptive uses, the Team discussed several strategies for accommodating users and service for each occupancy. Feasibility of each strategy was analyzed in plans, section and grading sketches. Unworkable ideas were replaced with new alternatives until three viable contrasting schemes emerged. After satisfying ourselves that all three met the criteria we had jointly developed, we proceeded with drawings and written analyses for presentation to project participants on January 26, 1990 and to the Fairmount Park Commission on February 14, 1990.

The dialogue between project team members and project participants to whom we presented was provocative and fruitful. It provided additional background for our development of the final masterplan, which proceeded a couple of month later. After discussion with other project participants and particularly with the prospective restaurant tenant, the Water Department asked us to study circulation variants which drew upon two of the schemes which we had presented. Eventually a consensus on direction was reached by the city and the Project Team was instructed to develop one of those variants as the masterplan for the site, focusing on an initial construction phase involving partial excavation of the Forebay without the reintroduction of water.

We would like to thank those who have been generous with us with their time and thoughts and who have provided us with an understanding of the complex context of the Water Works restoration project.

## II. BACKGROUND

- A. Chronological Summary
- B. Summary of Historic Significance

## CHRONOLOGICAL SUMMARY: FAIRMOUNT WATERWORKS

### **Supporting material**

To further support these decisions, we have summarized a chronology of the evolution of the site, drawing on Jane Mork Gibson's studies, the John Milner Adaptive Reuse Feasibility Study, the Historic Landmark Nomination by Carolyn Pitts, the archives of the Water Department and the numerous contemporary documents available in the Free Library, the Clio Group, Inc. Archives and so on. It is by no means all-inclusive, nor should it be viewed as a basis for restoration - merely as a platform for the setting of directions. When those directions are established, there should be additional research and documentation, particularly copy photography of the historic views to help establish details with a high degree of accuracy.

### **Chronological Summary**

The idea of a single, healthy water supply for the city from the Schuylkill first dates to Latrobe's Center Square design for the Watering Committee at the end of the 18th century. This initial attempt and its somewhat unreliable steam-powered engine were greatly improved upon by the Fairmount Water Works.

First construction of the Fairmount Water Works was begun in 1812, with a building using steam power to pump water to a reservoir at the top of the Fairmount hill. What we today recognize as the Water Works was begun in 1819 with the commission of the construction of a dam across the river and the excavation into the rock of the Fairmount of the forebay to run the waterwheels. The first of these began operating in 1822. The forebay, whose head arch bridge controlled the flow of water into the mill house, created a peninsula of the Water Works, separating it from the shore of the river. The mound dam portion of the complex turned off at an angle to the mill house.

The handsome neoclassical buildings were designed by Frederick Graff to accommodate visitation to view the workings of the mechanism, bringing the public to the site. The initial build included the engine house and the adjacent mill house, with a plaza area defined by a balustrade. A simpler rail fence was initially used on the head arch bridge. This rustic type of fence was also used to enclose the south garden and the path up to the top of the Fairmount.

By 1830, the garden on the southeast side of Engine House had been laid out and landscaped. Its design, one of a geometric path system, conveyed the notion of order and man's mastery of nature that corresponded to the Water Works itself. Two Frederick Graff, Jr. site plans from 1851, one of the Fairmount and one of the proposed recreational area above the Water works, reflect a layout based on a combination of radiating and grid motif areas. A modified quadrant plan fronted the engine house, with the eastern half forming three radiating areas. The area south of the Engine House was organized around the fountain which was framed by an elliptical path. The fountain first featured the Boy and Dolphin statue designed by Graff; in 1872 that was replaced by a bronze cast of Rush's Nymph and Bittern. South of the fountain ellipse the grid motif was repeated.

Views from the 1830s indicate that the pattern shown in the Graff plans were original, and an early twentieth century atlas shows that the pattern survived virtually unchanged through the nineteenth

century, with only the addition of a secondary ellipse adjacent to the engine house for the Graff Memorial. The early views also show that the south garden, while not particularly innovative in design, reflected contemporary landscape fashion. Curving paths defined manicured lawn areas planted with individual trees and shrubs in seeming random fashion. Planting sites are not specified in detail in the Water Department Annual Reports, though other committee records may well have discussed the issue in greater depth, and some species names are included. Early views indicate the importance of the weeping willow (*Salix babylonica*), a popular nineteenth century tree, at the Water Works, particularly along the river's edge on the sides of the mound dam, although maturity in these views cannot be relied upon.

The south garden clearly corresponds to what early nineteenth century English landscape theoretician J. C. Loudon termed the Gardenesque. A. J. Downing, American landscape author, named the same approach the Beautiful, contrasting it with the more naturalistic Picturesque. Downing notes that in the Beautiful "the keeping of such a scene should be of the most polished kind, --grass mown into a softness like velvet, gravel walks scrupulously firm, dry, and clean; and the most perfect order and neatness should reign throughout" [*A Treatise on the Theory and Practice of Landscape Gardening*, (6th ed., 1859. Reprint. New York, 1967), p. 58.]

Photographs from the Water Department records show the apparent persistence of this style of landscape treatment through the nineteenth century. The primary change came with the maturing of the trees, of which all appear to be deciduous, to form a dense shade canopy. It is of probable significance to the site that many evergreens are associated in Downing more with the Picturesque than with the Beautiful, particularly specimen tree species, which may account for their absence in the photographs, although other factors may have been involved. While detail is inconclusive, these photographs also indicate that certain areas may have been planted with lower ground cover varieties, possibly ivy or periwinkle, for example, while other areas clearly persist as turf. It is possible that the Victorian interest in bedding out that arose after mid-century may also have influenced the south garden plantings, although the sources provided for this report are inconclusive on this point.

Significant changes in the Water Works themselves at mid-century were begun by Frederick Graff, Jr. in the addition of the first turbine in 1851. This led to the need for an additional reservoir and a new standpipe was built at the top of the hill, clad in brick and in the style of a campanile. The stone distribution arch was constructed in this same connection in 1860. Photographs indicate that the standpipe and the arch were dramatic features, with the arch providing both an observation deck and, below, a framed view by means of a path which led through it from Fairmount. The new mill house was built between 1859 and 1862 to accommodate further new turbines on the site of the original mound dam, and a plaza was constructed on top, which expanded the area for public strolling. Graff added an open pavilion at the center of the original mill house, flanked by two entrance buildings on a plan similar to that originally envisioned by his father.

Landscape embellishments were added throughout the century. A gazebo was placed by 1830 at the end of the mound dam, overlooking the river. Early on, another gazebo, originally an open air trellis, also articulated a vantage point on the hill. Other observation points were created by additional gazebos on paths on the hill, with rustic summer houses being added in the 1860s, according to *The American Architect and Building News* by Frank Furness. The paths on the hillside were developed to a complex system, including a dramatic descent through the distribution arch. The stone balustrade which originally defined the mill house was extended to the head arch bridge, the new mill house, and to the

distribution arch, defining the zone of the Water Works. Rustic, woven tree branch fences and elegant, curvilinear cast iron railings replaced the rail fence on the paths up the hill and in the south garden, marking a clear distinction of zones between the Water Works and its adjacent areas. A large number of benches were added to the garden in the 1870s.

By the Centennial, the Water Works and its surrounding gardens were one of the premier sites in the city and the nation, prominently featured in city and Centennial guides. That use continued into the twentieth century, until the construction of the Art Museum sited on the old reservoir, and the development of the Parkway which funneled its traffic onto the East River Drive. This new highway cut the Water Works off from its old support facilities - particularly Lemon Hill which was transformed into the museum director's residence. The former public boathouse was pressed into service as a refreshment stand; the Water Works were adapted to serve as an aquarium which in turn became a favorite feature of the city. One by one the surviving elements of the public realm were abandoned, leaving the Water Works as a fragment of the rich combination of technology and artistry that had so intrigued nineteenth century America.

## SUMMARY OF HISTORIC SIGNIFICANCE

The Fairmount Water Works was constructed for the single, apparently simple purpose of providing the City of Philadelphia with a healthful water supply. This one initial reason for existence belies the Water Works' complex role in the nineteenth century city and its impact not only throughout this country, but internationally. Because of its uncommon richness, it was recognized as a National Historic Landmark in 1976.

The Water Works merges, in a truly remarkable fashion, several areas of landmark historic significance within this one public amenity. As an example of civic design, it combines engineering innovation with the elegance of architecture and sculpture. It is also strategic as public landscape architecture and a place of recreation. All these elements combined to create a site which, though now changed, remains a crucial place for the city, symbolizing its commitment to enhancing public welfare, both by providing a vital utility and enormous aesthetic and recreational enrichment.

As an engineering phenomenon, Fairmount's list of technical firsts is extremely impressive, as is the ingenuity of Graff's design, and warrants its status as a National Engineering Landmark. That it was simply the first to provide the city with a reliable supply of (relatively) healthy water was probably sufficiently impressive to its contemporary residents. The Water Works was also located virtually adjacent to another nineteenth engineering marvel, the Wire Bridge at Callowhill Street.

It is particularly significant that what today might be considered merely a utility was designed as a place of public visitation. It was a place of allegory of the dominance of nature for man's benefit, and of the triumph of science and art. This is evident in the elegant neo-classical design of the architecture, which created a discreet sense of place accentuated by the forebay bridge, particularly in contrast to the stone of the cliff behind. The allegorical element is most explicit in Rush's (significant as the first native American sculptor) beautiful statues, in which the Schuylkill is freed by the Water Works to benefit man. The benefited public was thus instructed by the vision of the mastering of the river in the form of the water rushing through the forebay and the motion of the machinery.

The two rivers which bound the city have played distinct roles in its formation. The Delaware, initially much more navigable, served for transportation and commerce, and as the starting point for the urban center. The Schuylkill, by contrast, shallow and marshy before nineteenth century dredging, became the river of leisure. Country seats were built on its higher banks that provided picturesque views. Hence, a civic service which performed a recreational role in addition to a purely functional one was entirely appropriate to the smaller river. The idea of domination of nature for the benefit of man is carried out even in the garden. Here, geometric paths border and confine the vegetation.

The Water Works formed the crucial nucleus for a public, recreational river zone which was first extended to Lemon Hill. There, the mental refreshment provided by the passive viewing of wonders of science, art, and nature at the Water Works could be combined with refreshment of the body. Food and drink could be had on a trip out of the city which could include an excursion further up-river on a boat leaving from above the forebay. In addition to Lemon Hill, the Rialto, a popular tavern above the forebay, provided this service. The recreation provided by the river zone was enhanced by the addition of the boathouses beginning in the 1860s. Their pleasing appearance was legislated by the city.

As the genesis of what was to become Fairmount Park, one of this country's first, and as a design

treasure in many ways, the Water Works are of obvious enormous importance. They are not only of great importance to Philadelphia's past, but of immense, enduring value to the present.

### III. HISTORIC PRESERVATION PHILOSOPHY

- A. Symbolic Re-creation
- B. Accurate Physical Preservation

## HISTORIC PRESERVATION PHILOSOPHY

The Design Team approached the Feasibility Study of development alternates for the Forebay of the Fairmount Water Works, weighing historic preservation criteria along with other major goals. We felt that selection of our team, with its strong record of restoration and preservation projects, represented a desire on the part of the selection committee for a solution grounded in historic preservation.

The theoretical approaches suggested in the Introduction indicate the problems of defining an appropriate preservation goal. Grappling with that definition problem, we have come to differentiate between two quite different approaches to restoration, accurate physical restoration of authentic historic fabric and symbolic re-creation of key elements. The former approach has been much discussed by preservation professionals and advocates, so that preservation practice in the 1990s is based upon a general consensus, which is succinctly summarized in the Secretary of the Interior's Standards for Historic Preservation Projects. The latter approach is probably more frequently discussed by planners and designers than by preservationists and lacks the authority of professional consensus. In symbolic re-creation one seeks to distill from history the essence of a site or building and create a means of conveying a gestalt understanding of key forms and concepts. The re-creations range from literal duplication to metaphoric artifice. At the literal end of the continuum, built fabric conveys very concrete forms, while at the metaphoric end, artifices such as tromp l'oeil paintings or sculptural outlines are substituted, as suggestions or ghosts of the forms or concepts.

### Symbolic Re-creation

Many early preservation projects in the 1940s and 50s in the United States might now be viewed more as symbolic re-creations than as accurate physical restorations. In the attempt to create a gestalt whole, planners and architects went beyond the documentary and built evidence, adding conjectural elements to complete the image of new buildings at Williamsburg, Independence Park in Philadelphia and elsewhere. In the case where the building is gone, the literal symbolic re-creation approach can be justified on grounds that the building was a key missing link, essential to understanding the lives of significant groups or individuals, to understanding the settings for both important and routine historic events, to understanding the architectural composition and function of interrelated buildings at a site.

To facilitate understanding of those buildings, symbolic re-creation often includes period furnishing and landscaping. It can be carried to the theatrical extreme of peopling facsimile buildings with museum personnel, garbed in period clothing and enacting daily activities of the period. Plimouth Plantation in Massachusetts is an example of a completely reconstructed village, in which the recreated setting is essential to the pedagogical objective of accurate reestablishment and reenactment of all the processes of daily life. Historic Williamsburg adds to the reconstructed village with historic processes numerous experiences for the modern visitor, including restaurants, inns and other services based on historic menus and processes offered in historic settings. As with such historic resorts as Cape May, NJ, Newport, RI, Saratoga, NY, the interest and quality of the visitor's imaginative and actual experience is an important ingredient in popularity of the site and success of the service facilities.

When applied to existing buildings, the symbolic re-creation approach has been seriously discredited since it can result in the irreversible destruction of built evidence. To return an existing building to a clear gestalt representation of its most significant appearance often implies removal of or at least damage to the evidence of accrued alterations, which themselves may be significant representatives of an

to work on as many levels as possible. This means that neither aesthetic ideals nor historic integrity are absolutes, but rather that the design process involves a dialectic between them and a synthesis which attempts to do justice to both. Even seemingly inflexible parameters, such as functional use and budget, may have numerous options, since variation of spatial relationship may result in user efficiency or construction economy. Balance must be sought in application of both canons of proportion and preservation guidelines, such as the Secretary of the Interior's Standards for Historic Preservation Projects.

Accordingly, current preservation practice combines maximal preservation of existing significant built fabric, as it has evolved, with a flexible approach toward missing elements. Historians attempt to establish a coherent interpretation based upon the appearance at some one point in the site's evolution, usually not the earliest period, with which later alterations are inconsistent, but one which includes as much as possible of the existing built fabric. Elements are selected for preservation as they constitute part of the whole during the period of significance. Uncovering concealed elements, finishes, etc. from the period of significance is acceptable unless it requires removal of significant later work. Conversely, removal is often the appropriate strategy for later incompatible alterations which eliminate or mask elements from the period of significance. Reconstruction of missing elements consistent with that period of significance is likewise acceptable if documentary and built evidence provides a sufficient basis for accurate matching, but reproduction of elements from an earlier period is discouraged, particularly if their inclusion requires removal of later significant material or if new work cannot be clearly differentiated from original fabric.

## IV. DESIGN OBJECTIVES

- A. Historic Preservation Objectives
- B. Occupancy Objectives
- C. Current Physical Constraints

## DESIGN OBJECTIVES

### Historic Preservation Objectives

While it is motivated by a desire to create once again at the Water Works a popular destination and is grounded in a combination of symbolic re-creation and new synthesis, the Design Team's approach to the Fairmount Water Works Forebay is consistent with the philosophical framework for accurate physical restoration. The starting point was review of the chronology of alterations to the setting of the Fairmount Water Works and evaluation of the significance of the site as it exists in 1990. Historic preservation objectives which have guided the Team, along with functional, aesthetic and other goals, emerged from that review.

### The Setting in 1990

As discussed by George E. Thomas in the introduction, the setting of the Water Works was significantly altered during the early years of the 20th century. First the turbines and pumps within the Mill Houses, and the enormous piping up the hill to the reservoirs, were removed to make way for a new water-related use, aquarium tanks. In 1919, the Distribution Arch and Standpipe tower were demolished, the art museum rose from the hilltop and the Forebay was infilled for a new drive up to the Engine House. That drive was laid out to connect the East River Drive and the old Spring Garden Bridge as part of the masterplan by Paul P. Cret and Jacques Greber for the Benjamin Franklin Parkway. Located at the intersection of the new Parkway and the existing Fairmount Avenue, the Fountain of the Sea Horses became the pivot for adjustment of the angle of East River Drive to the axis of the new Parkway.

Creation of a tree-lined allee along Aquarium Drive framed the Water Works as the focus of views from the Drive. At the Fountain, however, that axis was seen to be balanced by another allee leading to Fairmount Avenue, and attention was shifted to the one opening in the ring of trees around the fountain, the new vista up the hillside Reilly Memorial to the Museum. Interestingly, the outer portion of the Forebay was shown in the 1919 masterplan filled with water right up to the edge of the vehicular circle around the Fountain. The Water Works was still deemed sufficiently important for integration into the new masterplan, which created an enlarged context for its immediate setting, one which remained little altered until the 1960s. With the notable exception that Aquarium Drive was stopped short of the South Garden and never connected to the bridge, the Parkway plan was executed. The classical temples of the Water Works were aped in form but dwarfed in scale by the enormous new temple atop the acropolis of Fair Mount. The grand boulevard scale of the Parkway and Aquarium Drive updated the site in an increasingly automobile-oriented city but overwhelmed the rustic cliffside paths and parterre walks of the south garden. Had there been no further changes in the setting, the Parkway masterplan might have provided still the kind of significant alteration which would have been adopted by preservationists of the 1990s as a legitimate preservation base, despite its diminishment of the Water Works site.

Three changes have occurred, however, to cause the Design Team to look again at the question of period of significance for the site. First, the possibility of connecting Aquarium Drive with the Spring Garden Bridge was irrevocably eliminated by the construction of two modern steel bridges for high speed travel on West River Drive and Spring Garden Street. Second, a path of building restoration to the 1871 appearance was adopted in 1981 and a considerable restoration program has been completed on that basis. Third, the Fairmount Avenue axis which balanced Aquarium Drive in the Parkway masterplan has been increasingly severed by widening of East River Drive effectively truncated and turned over to

exclusive use as a parking lot. Of the three grand axes, only the Reilly Memorial remains as designed.

#### Accurate Physical Preservation Objectives for the Forebay

Application of the Design Team's historic preservation philosophy to the Fairmount Water Works site leads to several base assumptions. Consistent with accurate physical preservation practice in the 1990s, the project team sought to maximize preservation of existing significant historic built and landscaped fabric in the context of the 1871 appearance of the site. Existing buildings, the Mill Houses and the classical temples atop the rebuilt deck, recently restored based to 1871 appearance, are assumed to be preserved. Likewise the unrestored promenade and gazebo atop the mound dam and the New Mill House are assumed eventually to be restored and maintained. As a corollary, massive, long-demolished elements, such as the distribution arch and standpipe tower are assumed not to be reconstructed. Since the original bridge, west and south walls of the Forebay are presumed to remain intact, their preservation and restoration became reasonable objectives, despite their burial underground.

The south garden, which survived the 1919 replanning and which appears to retain original parterre paths and some sculptural elements, is assumed to warrant further study as a candidate for restoration to the extent documentation exists. For example, lithographs and photographs provide numerous glimpses of plantings and landscape elements, such as paving, fences, benches, and lamps. Given the dedication of the site historically to water and given the numerous symbolic manifestations of water in the garden fountains, reintroduction of water is important in the garden as well as in the Forebay. While they are deteriorated and have lost their decorative iron railings, the cliffside walkways are well documented and remain sufficiently intact for restoration.

#### Symbolic Re-creation Objectives for the Forebay

The Design Team's approach to the Forebay, however, blends a heavy emphasis on symbolic re-creation with accurate physical preservation of the existing retaining walls. Reintroduction of water into the Forebay is symbolically fundamental to the objective of contribution of the setting to interpretation of the unique engineering and architectural landmark, since the function of the Water Works is comprehensible only when the flow of the water through the mill house machinery can be visualized or imagined. Reexcavation of the Forebay for the water recreates the void necessary to reacheive the picturesque setting which was once, and can be again, alluring: classical temples aligned along the peninsula of the Mill Houses to form a promenade linking the machinery of man's domination over the forces of nature with the gazebo at the end of the dam, where the raw power of the water is heard and viewed. If restoring water in the Forebay cannot be accomplished immediately, no work undertaken in the short range development of the site should preclude that future possibility.

#### Occupancy Objectives for the Water Works

To assure the commitment, public or private, to maintenance of the restored Water Works, it must regain popularity and respect as a public amenity: available and accessible for enjoyment by everyone. To this end, the site should accommodate multiple uses, through all four seasons of the year, which appeal to and are supported by a variety of constituencies. This fundamental objective has been recognized by representatives of the Water Department and the Fairmount Park Commission in their search for occupancy of the buildings by uses which will attract visitors and contribution by the building occupancy toward maintenance of the site. Because the Water Works has always been and remains a

public amenity, such uses should be intended for as broad a public as possible. Such uses should provide regular types and levels of activity which attract both repeat and occasional visitors. It is hoped that the proximity to Fairmount Park and the natural amenities of the setting will perpetuate traditional recreational uses of the site, such as fishing, boating, strolling, picnicking, bicycling, jogging. Recreational uses might be expanded to include canoeing and ice skating in the Forebay, and a marina on the riverfront.

As of the date when the Forebay Feasibility Study was undertaken, planning for the site had proceeded toward identification of appropriate occupants for portions of the buildings and planning was underway for their use of the site. The Water Department intends to create an Interpretive Center to celebrate water and depict the operation of the Water Works. According to plans prepared in 1986 by Matheu Cebul Associates, that public display will occupy the Engine House lower level and east end of the Old Mill House. During the course of the Forebay Feasibility Study, negotiations started several years ago, were underway with a restaurant for occupancy of the first floor of the Engine House and the majority of the Old Mill House. Use of the New Mill House is unidentified, although possibilities include expansion space for a restaurant and a small hydroelectric plant. Use of both Mill houses is limited by the flooding in severe 100 year storms. To reduce that problem, the floor level in the New Mill House was raised several feet during the rebuilding.

Since major portions of the Fairmount Water Works have been contained within the construction fence and closed to the public for nearly a decade, the exciting opportunity arises for its public reopening. Prior to opening of any single user area within the complex, public rededication of the Forebay and site might provide the occasion to establish the broadest possible welcome to visitors of all ages, all neighborhoods, all constituencies. In anticipation of such an event, awareness might be aroused by photo or essay competitions for which the Water Works is the subject. Depending on the relative timing of the two projects, such a rededication ceremony might serve as a fund-raising teaser for the Interpretive Center by raising questions which will be answered in the displays and exhibits of that project.

Long term involvement by groups with particular interest in the Water Works would increase its circle of advocates. For example, significant responsibility for the south garden could be assumed by a Friends of the South Garden group, which might raise funds initially for a study by a landscape historian of the appropriate restoration basis and determination of appropriate plantings. Actual execution of the garden restoration might be successfully achieved through volunteerism. Inclusion of the site in the route of the Fairmount Park House Tours would provide a fascinating counterpoint to the smaller scale and more private histories of the houses.

#### **Current Physical Constraints**

Finally, significant alterations to the site are considered givens. Two large underground storm water sewer lines are assumed to be maintained in their present locations, since both are relatively recent and since the expected cost of relocation is high. Entering the site just north of the bridge, under whose east arch it flows, the larger storm relief sewer parallels the east bank of the Forebay. The storm sewer is buried sufficiently deep that its top surface is below the historic water level. The concrete tunnel for the sanitary sewer, which parallels the Forebay east bank is fairly shallow, with its top surface slightly above the historic level of the water. A second storm water relief line runs east-west just to the north of the bridge, but it is buried deeper than the historic water level.

## V. SCHEMATIC DESIGN

- A. Scheme A: Cliffside Drive
- B. Scheme B: South Garden Ramp
- C. Scheme C: New Mill House Plaza
- D. Scheme A: Site Plan
- E. Scheme B: Site Plan
- F. Scheme C: Site Plan
- G. Schemes A, B, C: Site Sections

## SCHEMATIC DESIGN

As they considered possible solutions to the design challenge of the Forebay, Team members agreed early in their discussions that the essence of any solution had to be reexcavation of the Forebay and refilling it with water. Historically, that water race was the starting point for diversion of river water into the Works that distributed it for the citizens' use. Reintroduction of water would make graphic the functional relationship with the river of the buildings and the equipment they once contained. It would thus symbolize the original central role of Water at the site and recall the City's triumph of using simple, reliable technology in harnessing the river's power.

In the present context, it would enhance the picturesque grouping of restored classical temples by setting them off dramatically on the peninsula of the Mill Houses. Reintroduction of water into the Forebay would be consistent with historic preservation guidelines which discourage alterations that are functionally incompatible with original uses. This made water restoration schemes preferable to partial shallow excavation or diversion of a fully excavated but dry court to other functional uses which might limit the ability of the public to imagine the water race.

With reintroduction of water into the Forebay as the core concept of any solution, issues of vehicular service, pedestrian access, parking were put into perspective as secondary functional concerns. The context for their resolution included assumptions about occupancy of the restored Water Works buildings and use of the site.

Current plans call for creation of an Interpretive Center around the one remaining Jonval turbine below the Engine House deck-- devoted to the use of water and demonstrating the function of the Water Works. Entered through the South Entrance Building, that Center would be located completely below the deck, with an exhibit path meandering through the catacombs of the Engine House. It is conceived as a daytime operation, which will attract school groups and families. A fairly lengthy pedestrian approach, across the Forebay Bridge and along the Mill House deck is not seen as a problem, particularly if restoration of the Forebay enhances interpretation of the site to the public.

The planned use which will draw the largest number of visitors across the site is a dinner restaurant. It is expected to occupy the major portion of the reconstructed Old Mill House and now joint use with Instructional Center. During the course of the Feasibility Study, negotiations were underway between representatives of the Fairmount Park Commission and a restaurant which plans an evening operation with 250 seats. Concerned about the customers' willingness to walk, the restaurant prefers the shortest possible distance between the drop-off point and its door. Reliance on valet parking as a means of shortening that walk distance is acceptable to the restaurant operators.

Service requirements for both occupancies require occasional access to the door for emergency vehicles. While the Interpretive Center expects only occasional deliveries of exhibit materials and supplies, the restaurant will have daily deliveries and trash removal. Since that regular service is shown in each proposed solution to share pathways with pedestrian visitors, the Design Team recommends that hours of service be limited to those of minimal visitor use--perhaps in the early morning.

While there are no plans on the books for the unrestored New Mill House, possibilities discussed include expansion space for the restaurant or a small hydroelectric plant.

Even while the heart of the site has been inaccessible behind the construction fence over the past decade, recreational use of the site has been continuous. Fishermen line the the lower deck promenades on summer days. Joggers and cyclists traverse the trail that enters the site from the north and exits under the modern bridges to the south. Once the site is reopened, strollers will resume their ambles into the South Garden, which would ideally be restored with the fountains, statues, benches, walkways and plantings that once enriched it. In the schemes proposed by the Design Team to reintroduce water into the Forebay, the recreational possibilities would be expanded to include seasonal canoeing, model boating and ice skating. The Team endorses the ideas of recreating some of the facilities associated with the site in the 19th century. The steamboat landings above and below the dam might be replaced by marinas. Daytime visitors would doubtless enjoy refreshment stands or lunch bars, such as once existed in the South Garden and on the river bank between the Water Works and Boat House Row.

Common features at the core of all schemes presented are restoration of the Forebay Bridge to provide primary public access to the buildings of the Water Works and excavation and flooding of the Forebay to restore the visual drama of the buildings' peninsula setting. All schemes provide pedestrian access to the site from the Sea Horse Fountain circle, and from the Art Museum by way of the historic walkways down from the Reilly Memorial. The major differences occur in location of service and emergency access and in degree of regular intrusion into the site for visitor vehicular access. Schemes A and C are premised upon vehicular access from the north, while in Scheme B, access occurs from the "mainland" at the south.

#### **SCHEME A: CLIFFSIDE DRIVE**

##### **Grade Level Access from the Fountain of the Sea Horses to the Engine House Forecourt**

Along the foot of the cliff on the east side of the new forebay, a pedestrian walkway/service road links the Forebay Entrance Plaza to the north with the Engine House Forecourt to the south. This walkway/service road terminates at a Vehicle Turning Plaza in front of the Engine House. While serving as the new forecourt for the Engine House and as outdoor space for both the Interpretive Center and the Restaurant it also provides access for off-hours deliveries, emergencies and special occasions. Deliveries and trash removal for the restaurant and Interpretive Center would be via a lift from a new service bay below grade, accessible via a catwalk from the Old Mill House just above water level.

The proposed Forebay Entrance Plaza replaces Aquarium Drive as the new north entrance to the Water Works site and the valet drop-off point for the new restaurant in the Old Mill House. Primary access to the water works is on foot, from the Fountain of the Sea Horses to the north, across the Forebay Bridge or through the restored garden to the south. Major entrances to the Interpretive Center and the restaurant are at the Caretaker's and Engine Houses. New stairs from the walkway/service road to the new grass bank above the existing sanitary sewer will bring the visitor to the forebay waters edge. Restoration of existing paths and creation of new paths on the hillside connect this new link with the formal out door spaces of the Art Museum via the Reilly Memorial ramp.

## **ADVANTAGES**

1. Historic preservation: includes restoration of Bridge, Forebay Walls and garden; partial restoration of water in Forebay.
2. Connection to Park: new access provides strong link for pedestrians, joggers and bicyclists between the garden to the south and Fairmount Park to the north.
3. Parking: limited number of spaces on Aquarium Drive and Fairmount Avenue are nearby.
4. Service Access: direct access to Old Mill House via lift.

## **DISADVANTAGES**

1. Site interpretation: distinction between grand scale of the Art Museum and the intimate nature of the Water Works site is blurred; confusion caused by vehicles in Forebay.
2. Alterations: new drive & retaining wall cut into hillside; size of Forebay substantially reduced by access at south end; fill disposal to be off-site.
3. Occupancy: most intensive use (restaurant) in most remote building; space for Interpretive Center more limited than planned.
4. Service access: requires excavation of new service room and catwalk along Forebay; potential future uses of New Mill House difficult to service.
5. Valet parking: museum lots are remote from drop-off.
6. Phased development: limited by early allocation of Engine House and difficult access to future uses of New Mill House.

## **SCHEME B: SOUTH GARDEN RAMP**

Access from the Art Museum level to the Engine House Forecourt

Vehicular access is by a new ramp down from the Art Museum drive to the south end of the South Garden. Valet parking drop-off for the restaurant is at the top of this ramp taking advantage of the existing turning circle and adjacent lots for parking during after Art Museum hours. The ramp and access roads are kept to a minimum width and paved with the same material, probably brick, as the other garden paths. They terminate at a Vehicle Turning Plaza in front of the Engine House. While serving as the new forecourt for the Engine House and as outdoor space for both the Interpretive Center and the Restaurant it also provides access for off-hours deliveries, emergencies and special occasions. Deliveries and trash removal for the restaurant and Interpretive Center would be via a lift from a new service bay below grade, accessible via a catwalk from the Old Mill House just above water level. The proposed Forebay Entrance Plaza replaces Aquarium Drive as the new north entrance to the Water Works site and serves as a secondary drop-off point for the new restaurant and Interpretive Center.

As in Scheme A, primary pedestrian access to the Water Works is from the Fountain of the Sea Horses to the north, across the Forebay Bridge along the Old Mill House deck or through the restored garden to the south. Major entrances to the Interpretive Center and the restaurant are at the Caretaker's and Engine Houses. Along the foot of the cliff on the east side of the new forebay, a pedestrian walkway links the north end of the site to the restored Forebay Bridge. Restoration of existing paths and creation of new paths on the hillside link this new walkway with the formal outdoor spaces of the Art Museum. The south garden is connected to Fairmount Park, to the north, by the Old Mill Deck and the Forebay Bridge or along the new Forebay waters edge via new stairs at either end of the new grass bank above the existing sanitary sewer.

#### ADVANTAGES

1. Historic preservation: includes restoration of Forebay walls and Bridge; water in Forebay except grass bank covering existing sanitary sewer.
2. Site interpretation: Distinction between intimate nature of Water Works site and grand scale of the Museum is maintained.
3. Alterations: new ramp reuses fill from Forebay
4. Connection to park: traditional link across Old Mill House deck and Forebay Bridge.
5. Occupancy: intensive restaurant use in nearest building to driveway access; garden more intensively used; majority of Water Works not compromised by restaurant use.
5. Valet parking: after-hours use of Art Museum parking spaces augments limited nearby spaces on Aquarium Drive and Fairmount Avenue.
6. Phased development: South entrance maximizes flexibility for phasing north end development
7. Service access: direct to Engine House via lift.

#### DISADVANTAGES

1. Restoration: south end of garden and garden paths are considerably altered.
2. Site Interpretation: confusion caused by vehicles in the garden.
3. Service access: requires excavation of new service room and catwalk along Forebay; future uses of New Mill House difficult to service.

#### **SCHEME C: NEW MILL HOUSE PLAZA**

##### **Ramp Access from the Fountain of the Sea Horses to Lower Level of the New Mill House**

This scheme is based on the premise that the New Mill House is renovated and that the restaurant is moved northward to occupy it and only the north end of the Old Mill House, leaving ample space for the Interpretive Center, as originally planned. Primary vehicle access is down a ramp along the west side of the circle to the level of a new dam across the outer Forebay to the floor level of the New Mill House. New dam access serves as one of the major entrances to the restaurant as well as being the service access for deliveries and trash removal. The dam also separates and controls river water from the Forebay water. The deck level entrance to the restaurant is the Watering Committee Building. The Lower Terrace provides adjacent outdoor restaurant seating space. Both the New Mill House and the Terrace provide the restaurant with splendid views of the Water Works complex.

As in the previous schemes, primary pedestrian access to the Water Works is from the Fountain of the Sea Horses to the north, across the Forebay Bridge along the Old Mill House deck or through the restored garden to the south. The major entrance to the Interpretive Center is the South Entrance House. The proposed Forebay Entrance Plaza replaces Aquarium Drive as the new north entrance to the Water Works site and serves as a secondary drop-off point for the new restaurant and Interpretive Center. Along the foot of the cliff on the east side of the new forebay, a pedestrian walkway links the north end of the site to the restored Forebay Bridge. Restoration of existing paths and creation of new paths on the hillside link this new walkway with the formal outdoor spaces of the Art Museum. The south garden is connected to Fairmount Park by the Old Mill House Deck and the Forebay Bridge or along the new Forebay waters edge via new stairs at either end of the new grass bank covering the existing sanitary sewer.

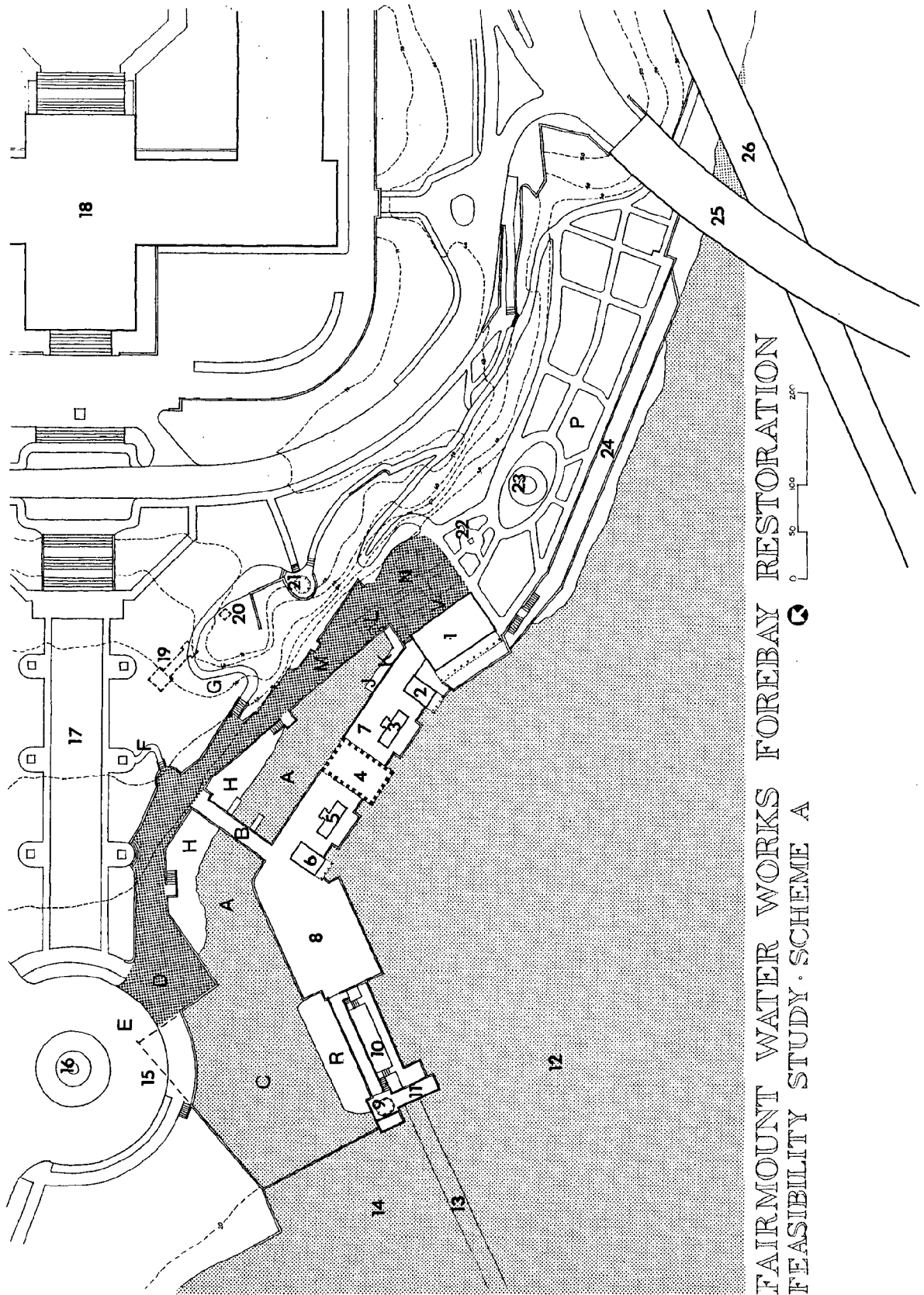
#### **ADVANTAGES**

1. Historic preservation: includes restoration of the Garden, Forebay walls and Bridge; water in Forebay except grass bank covering existing sanitary sewer and new dam to the New Mill House.
2. Site interpretation: Distinction between intimate nature of Water Works site and grand scale of the Art Museum is maintained.
3. Connection to park: traditional link is across Old Mill House deck and Forebay Bridge.
4. Alterations: Restaurant has minimum intrusion at deck level and in forebay area.
5. Occupancy: intensive restaurant use at nearest building to access from public road; identifiable separate entrances and workable circulation systems for both restaurant and Interpretive Center; New Mill House becomes "flag" for restaurant rather than the Engine House.
6. Service access: direct same-level access to New Mill House; minimal requirements for remote Engine House.

7.     Parking: limited number of spaces on Aquarium Drive and Fairmount Avenue are nearby.
8.     Phased development: long-range use of site maximized; restaurant becomes catalyst for restoration of New Mill House.

#### **DISADVANTAGES**

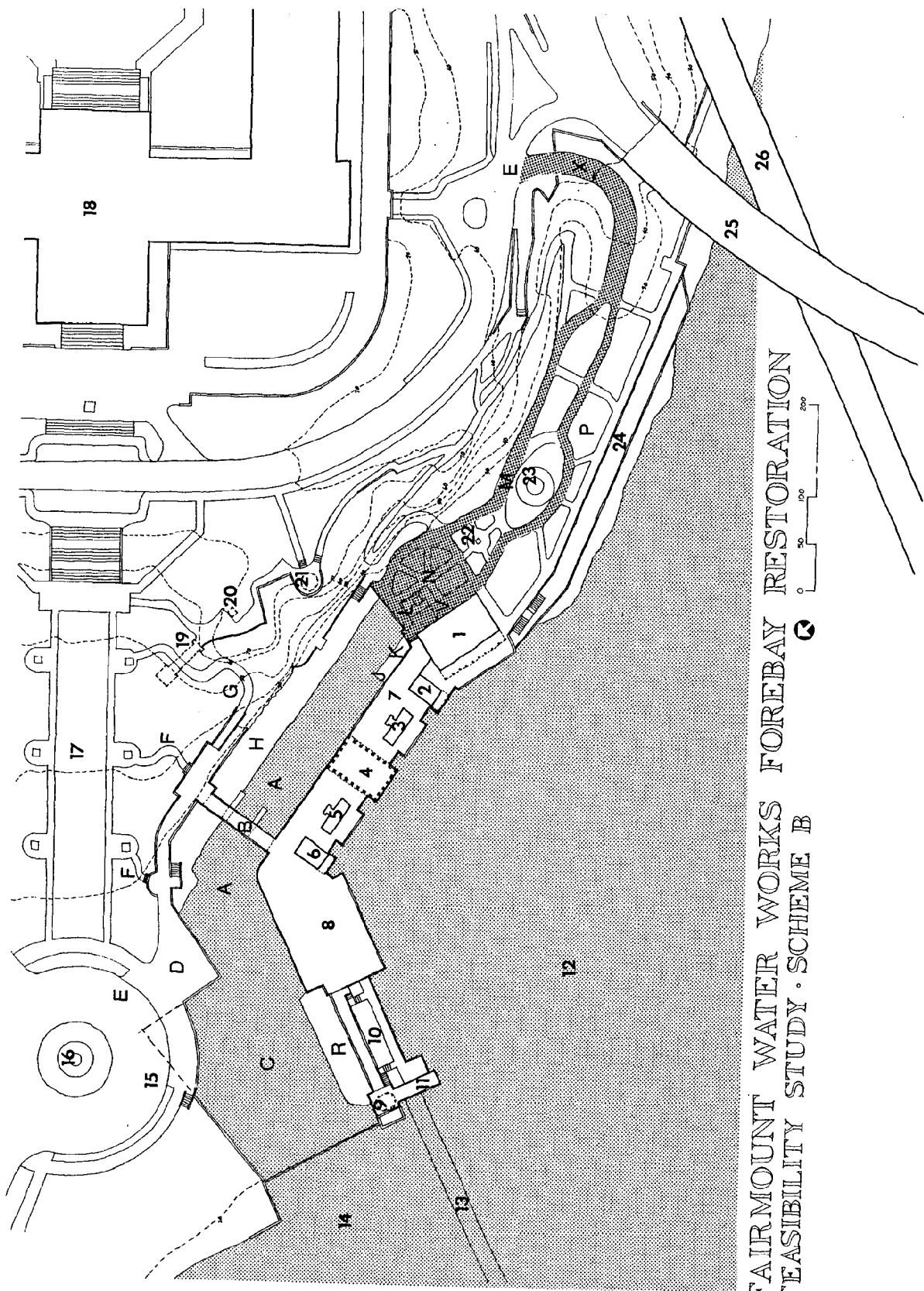
1.     Restoration: Forebay at new dam entrance is altered.
2.     Alterations: addition of minimally intrusive new dam across outer Forebay, new drive and retaining walls cut into lawn; fill disposal to be off-site.
3.     Valet parking: Art Museum lots are remote for drop-off.



### Scheme A Legend

- 1 Engine House
  - 2 Caretaker's Quarters
  - 3 South Entrance House
  - 4 Pavilion
  - 5 North Entrance House
  - 6 Watering Committee Building
  - 7 Old Mill House
  - 8 New Mill House
  - 9 Gazebo
  - 10 Lower Terrace
  - 11 Fishing Pier
  - 12 Schuylkill River (EL. +6.94)
  - 13 Fairmount Dam
  - 14 Schuylkill River (EL. +12.56)
  - 15 Outline of Original Forebay (Shown Dotted)
  - 16 Fountain of the Sea Horses
  - 17 Reilly Memorial
  - 18 Philadelphia Museum of Art
  - 19 Site of 1860 Distribution Arch
  - 20 Site of 1851 Standpipe Tower
  - 21 Gazebo
  - 22 Graff Memorial
  - 23 South Fountain
  - 24 River Esplanade
  - 25 Spring Garden Street Bridge
  - 26 West River Drive
- 
- A Restored Forebay (3' Deep Water)
  - B Restored Forebay Bridge
  - C Restored Forebay (River Depth)
  - D New Forebay Entrance Plaza
  - E New Restaurant Valet Parking/Interpretive Center Drop-Off
  - F New Path
  - G Restored Existing Path
  - H New Grass Bank above Sanitary Sewer
  - J New Emergency Exit and Delivery Entrance
  - K New Walkway to Trash Area (Below Grade) and Service Lift
  - L New Trash Area (Below Grade) and Service Lift
  - M New Service Drive/Pedestrian Walkway
  - N New Vehicle Turning Plaza
  - P Restored Garden
  - R Restored Lower Mound Dam
  - V New Ceremonial/Special Occasion Drop-Off and Deliveries

Note: Elevations are 7 Ft. above City Datum

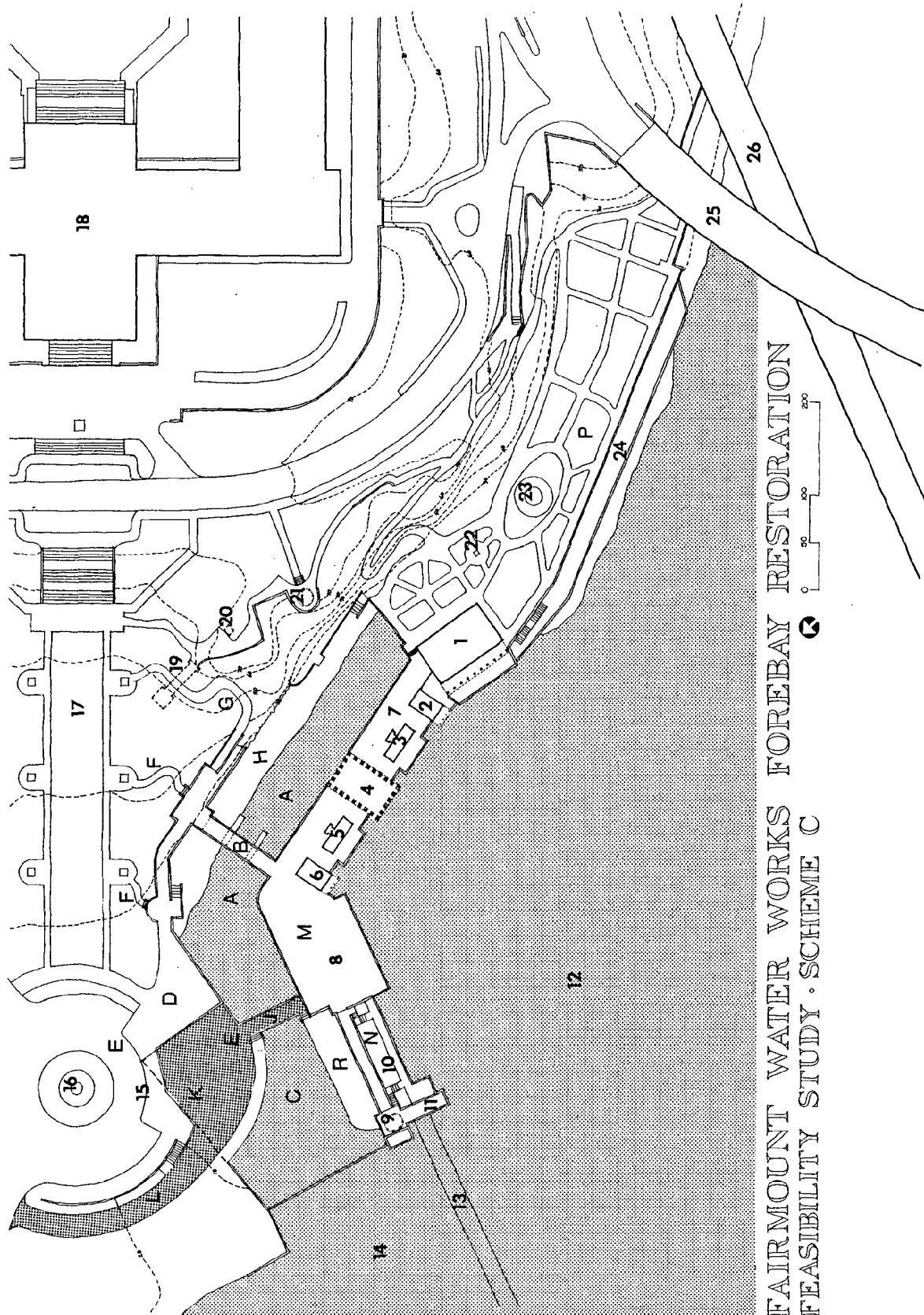


FAIRMOUNT WATER WORKS FOREBAY RESTORATION  
 FEASIBILITY STUDY - SCHEME B

### Scheme B Legend

- 1 Engine House
  - 2 Caretaker's House
  - 3 South Entrance House
  - 4 Pavilion
  - 5 North Entrance House
  - 6 Watering Committee Building
  - 7 Old Mill House
  - 8 New Mill House
  - 9 Gazebo
  - 10 Lower Terrace
  - 11 Fishing Pier
  - 12 Schuylkill River (EL. +6.94)
  - 13 Fairmount Dam
  - 14 Schuylkill River (El. +12.56)
  - 15 Outline of Original Forebay (Shown Dotted)
  - 16 Fountain of the Sea Horses
  - 17 Reilly Memorial
  - 18 Philadelphia Museum of Art
  - 19 Site of 1860 Distribution Arch
  - 20 Site of 1851 Standpipe Tower
  - 21 Gazebo
  - 22 Graff Memorial
  - 23 South Fountain
  - 24 River Esplanade
  - 25 Spring Garden Street Bridge
  - 26 West River Drive
- 
- A Restored Forebay (3'Deep Water)
  - B Restored Forebay Bridge
  - C Restored Forebay (River Depth)
  - D New Forebay Entrance Plaza
  - E New Restaurant Valet Parking/Interpretive Center Drop-Off
  - F New Path
  - G Restored Existing Path
  - H New Grass Bank above Sanitary Sewer
  - J New Emergency Exit and Delivery Entrance
  - K New Walkway to Trash Area (Below Grade) and Service Lift
  - L New Trash Area (Below Grade) and Service Lift
  - M New Service Drive/Pedestrian Walkway
  - N New Vehicle Turning Plaza
  - P Restored Garden
  - R Restored Lower Mound Dam
  - V New Ceremonial/Special Occasion Drop-Off and Deliveries
  - X New Ramp from Museum Drive to Garden Level

Note: Elevations are 7 Ft. above City Datum

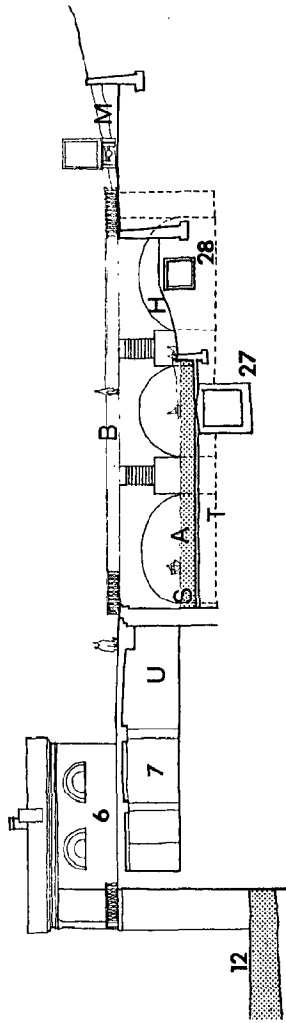


FAIRMOUNT WATER WORKS FOREBAY RESTORATION  
FEASIBILITY STUDY - SCHEME C

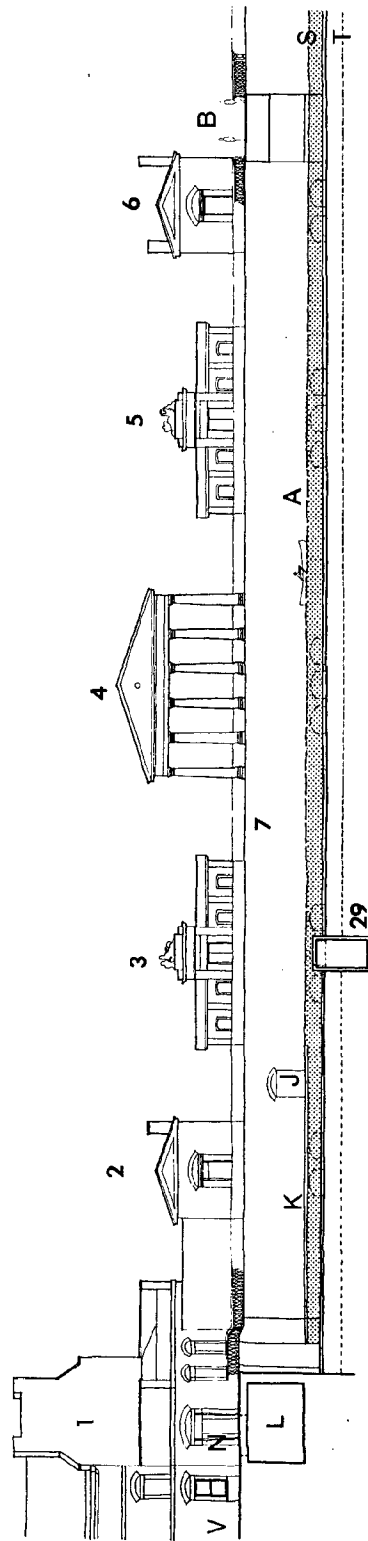
### Scheme C Legend

- 1 Engine House
  - 2 Caretaker's Quarters
  - 3 South Entrance House
  - 4 Pavilion
  - 5 North Entrance House
  - 6 Watering Committee Building
  - 7 Old Mill House
  - 8 New Mill House
  - 9 Gazebo
  - 10 Lower Terrace
  - 11 Fishing Pier
  - 12 Schuylkill River (EL. +6.94)
  - 13 Fairmount Dam
  - 14 Schuylkill River (EL. +12.56)
  - 15 Outline of Original Forebay (Shown Dotted)
  - 16 Fountain of the Sea Horses
  - 17 Reilly Memorial
  - 18 Philadelphia Museum of Art
  - 19 Site of 1860 Distribution Arch
  - 20 Site of 1851 Standpipe Tower
  - 21 Gazebo
  - 22 Graff Memorial
  - 23 South Fountain
  - 24 River Esplanade
  - 25 Spring Garden Street Bridge
  - 26 West River Drive
- 
- A Restored Forebay (3' Deep Water)
  - B Restored Forebay Bridge
  - C Restored Forebay (River Depth)
  - D New Forebay Entrance Plaza
  - E New Restaurant Valet Parking/Interpretive Center Drop-Off
  - F New Path
  - G Restored Existing Path
  - H New Grass Bank above Sanitary Sewer
  - J New Restaurant and Delivery Entrance Bridge/Dam
  - K New Vehicle Turning Plaza
  - L New Ramped Access Road
  - M New Restaurant in New Mill House
  - N Restaurant Terrace
  - P Restored Garden
  - R Restored Lower Mound Dam

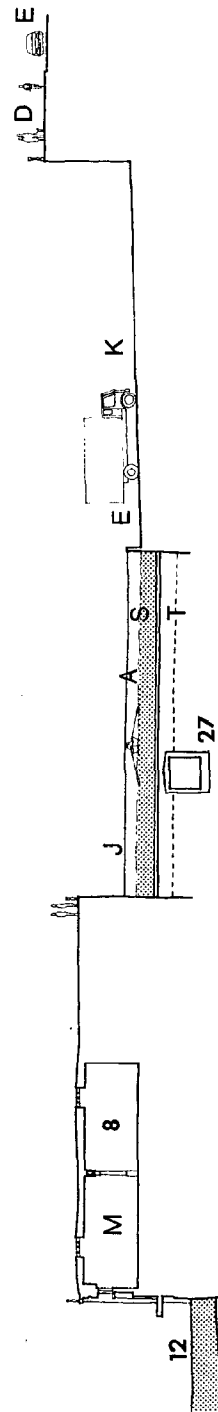
Note: Elevations are 7 Ft. above City Datum



FOREBAY SECTION AT OLD MILL HOUSE - SCHEME A



LONGITUDINAL FOREBAY SECTION - SCHEME B



FOREBAY SECTION AT NEW MILL HOUSE - SCHEME C

# FAIRMOUNT WATER WORKS FOREBAY RESTORATION FEASIBILITY STUDY

## Sections Legend

### Scheme A

- 6 Watering Committee Building
- 7 Old Mill House (Restaurant/Interpretive Center)
- 12 Schuylkill River (EL. +6.94)
- 27 Existing Main Relief Sewer
- 28 Existing Sanitary Sewer
- A Restored Forebay (3' Deep Water)
- B Restored Forebay Bridge
- H New Grass Bank above Existing Sanitary Sewer
- M New Service Drive/Pedestrian Walkway
- S Original Forebay High Water Level
- T Original Forebay Bottom (Shown Dotted)
- U New Restaurant

### Scheme B

- 1 Engine House
- 2 Caretaker's House
- 3 South Entrance House
- 4 Pavilion
- 5 North Entrance House
- 6 Watering Committee Building
- 7 Old Mill House (Restored Existing Forebay Wall)
- 29 Existing Relief Sewer
- A Restored Forebay (3' Deep Water)
- B Restored Forebay Bridge
- J New Emergency Exit and Delivery Entrance
- K New Walkway to Trash Area (Below Grade) and Service Lift
- L New Trash Area (Below Grade) and Service Lift
- N New Vehicle Turning Plaza
- S Original Forebay High Water Level
- T Original Forebay Bottom (Shown Dotted)
- V New Ceremonial/Special Occasion Drop-Off and Deliveries

### Scheme C

- 8 New Mill House
- 12 Schuylkill River (EL. +6.94)
- 27 Existing Relief Sewer
- A Restored Forebay (3' Deep Water)
- D New Forebay Entrance Plaza
- E New Restaurant Valet Parking/Interpretive Center Drop-Off
- J New Restaurant and Delivery Entrance Bridge/Dam
- K New Vehicle Turning Plaza
- M Restaurant in New Mill House
- S Original Forebay High Water Level
- T Original Forebay Bottom (Shown Dotted)

Note: Elevations are 7 Ft. above City Datum

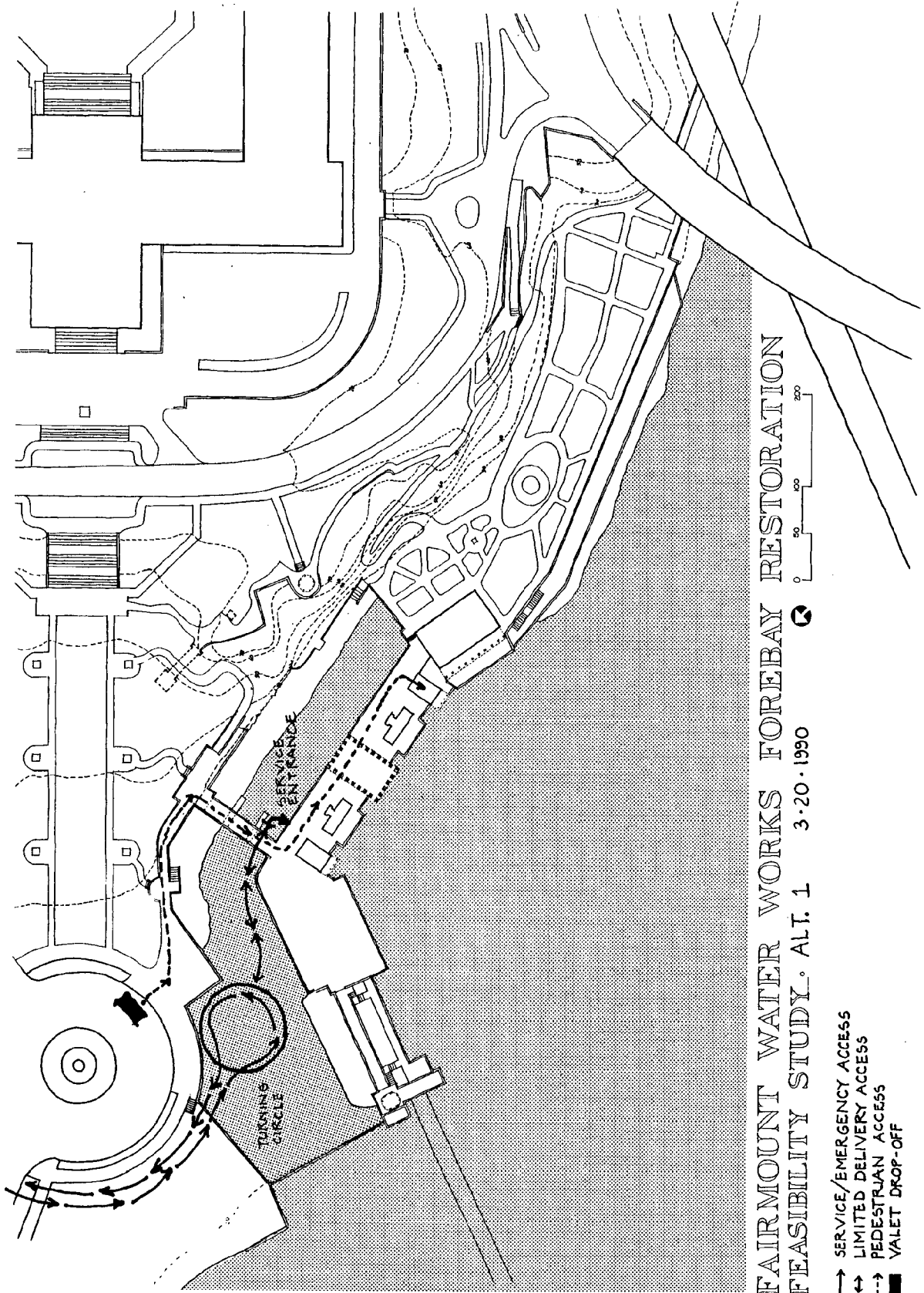
VI. CIRCULATION STUDIES  
FOR NORTH ACCESS:  
ALTERNATES 1 - 4

## CIRCULATION STUDIES FOR NORTH ACCESS

Following the presentation of Schemes A, B and C to representatives of the Water Department, Fairmount Park Commission and the Philadelphia Historical Commission, the Project Team was asked to investigate alternatives for vehicular access from the north while permitting reintroduction of water into the Forebay.

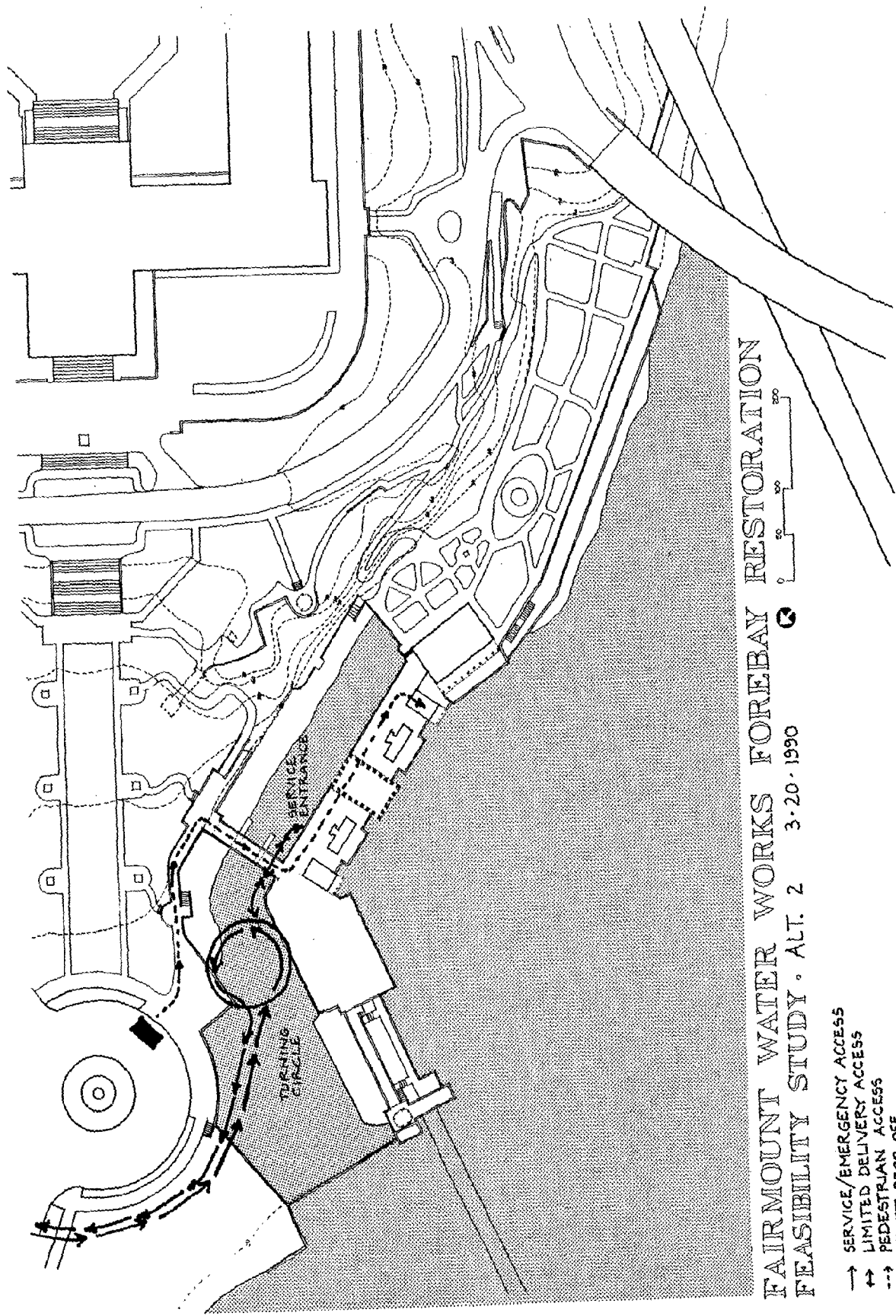
The first two alternatives studied were variants on Scheme C, with primary pedestrian access from a valet drop-off point on the Circle across the Forebay Bridge and Old Mill House deck. In each, a ramp down from the circle to the outer Forebay provides a lower level service access beneath the Bridge to the northeast corner of the Old Mill House. Service access is thus separated from pedestrian user access. Exact location of the service turn-around is shown closer to the Bridge in Alternate 2 than in Alternate 1, but in both cases the potential restoration of the outer Forebay with water reintroduced is compromised by the turn-around.

Reintroduction of water into the outer Forebay remains as a restoration objective in the third and fourth alternatives. In the third, a turn-around at the east end of the Forebay Bridge is cut into the hillside, which is protected with new retaining walls. While this implies alteration of the hillside zone between the Forebay and the Reilly Memorial, it leaves intact the potential restoration zones of the Water Works site. The fourth alternative depends on a through loop of vehicular circulation rather than on a turn-around. Vehicles are assumed to traverse the Reilly Memorial part way up the hill and to stop briefly at the east end of the Bridge to discharge passengers. Both the third and fourth alternatives mix pedestrians with service use of the Bridge, although such uses can be separated since they occur at different times of the day.



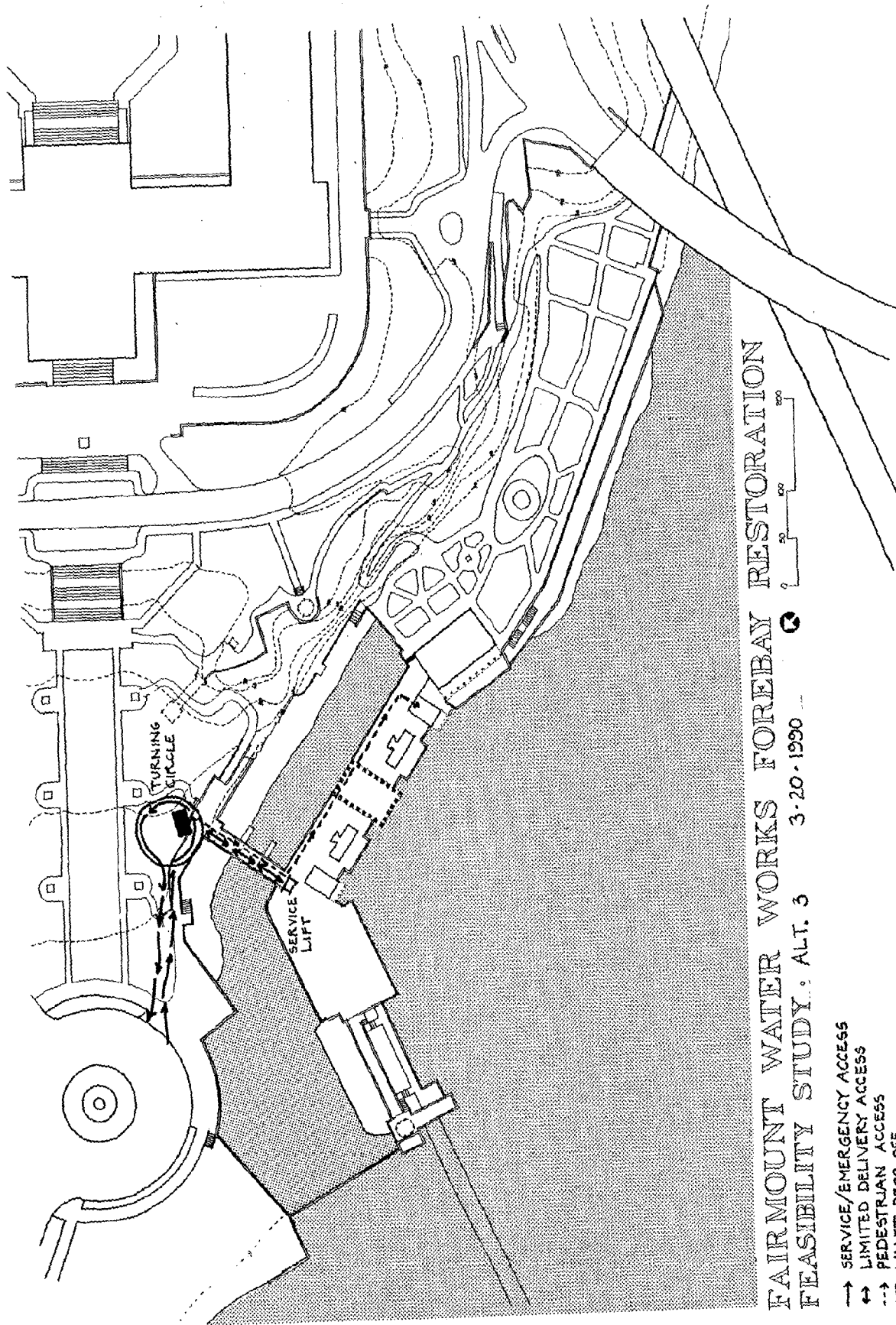
# FAIRMOUNT WATER WORKS FOREBAY RESTORATION FEASIBILITY STUDY. ALT. 1 3-20-1990

- SERVICE/EMERGENCY ACCESS
- ↔ LIMITED DELIVERY ACCESS
- PEDESTRIAN ACCESS
- VALET DROP-OFF



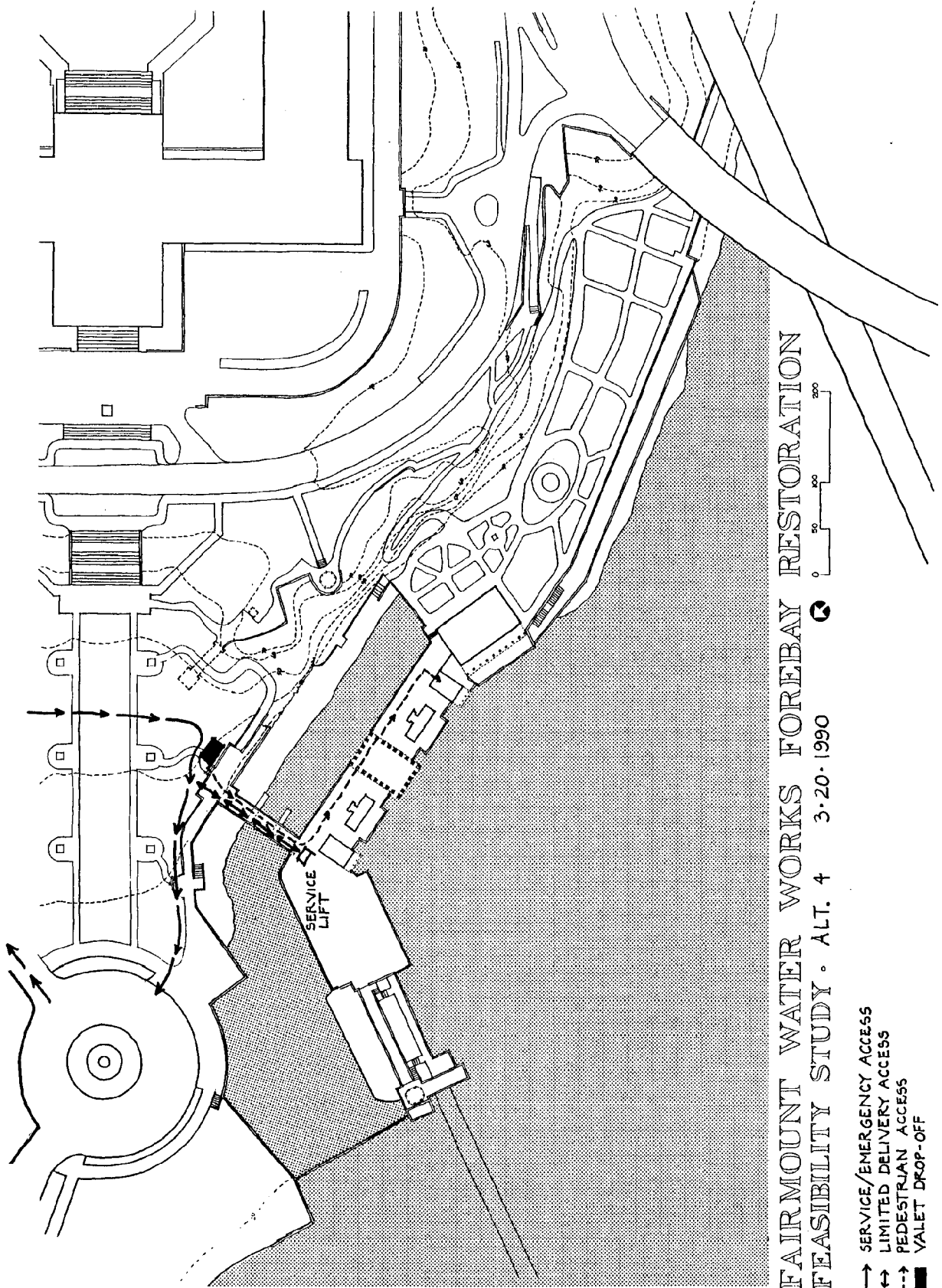
# FAIRMOUNT WATER WORKS FOREBAY RESTORATION FEASIBILITY STUDY - ALT. 2 3-20-1990

- SERVICE/EMERGENCY ACCESS
- LIMITED DELIVERY ACCESS
- PEDESTRIAN ACCESS
- VALET DROP-OFF



FAIRMOUNT WATER WORKS FOREBAY RESTORATION  
 FEASIBILITY STUDY: ALT. 3 3-20-1990

- SERVICE/EMERGENCY ACCESS
- ↔ LIMITED DELIVERY ACCESS
- - - PEDESTRIAN ACCESS
- VALET DROP-OFF



FAIRMOUNT WATER WORKS FOREBAY RESTORATION  
 FEASIBILITY STUDY • ALT. 4 3-20-1990

- SERVICE/EMERGENCY ACCESS
- ↔ LIMITED DELIVERY ACCESS
- ... PEDESTRIAN ACCESS
- VALET DROP-OFF

## VII. FOREBAY MASTERPLAN

- A. Long Range Site Development
- B. Phase One: Scheme D
- C. Scheme D: Site Plan
- D. Scheme D: Site Sections

## RECOMMENDED FOREBAY MASTERPLAN

### LONG RANGE SITE DEVELOPMENT

At the heart of the long range masterplan is the reexcavation of the outer Forebay so that the entire water race can be refilled with water. Reintroduction of water symbolizes the central role of water at the Water Works and recaptures the drama of the peninsula setting of the classical temples. While a low dam is proposed for flood and sediment control, the scheme reestablishes the watery connection to the river above the dam. The old Aquarium Drive will be replaced by a narrow walkway along the cliff edge, which will double as an emergency vehicular access to the Engine House. The primary vehicular drop-off will be a tree-shaded plaza off the Sea Horse Fountain Circle, with visitors walking from there along the walkway and across the Forebay Bridge to the Water Works buildings. A turn-around cut into the hillside at the east end of the Forebay Bridge will provide service access during hours of low visitation. Cut into the hillside, that turn-around will be detailed not in the fashion of a great Beaux-Arts exedra, but rather as a grotto-like ravine, in keeping with the character of the rough Fairmount hillside that forms the natural feature of the site. Retaining wall materials for the walkway and turn-around will be rough and dark, to blend in with the rock outcroppings. Brick paving will be consistent with restored historic materials of the site. The cast iron balustrade will be replicated in locations where it existed historically, the Bridge, south and west edges of the Forebay, the Mill Houses. Modern wrought iron will be used for new railing locations, such as the new walkway/drive along the Forebay east edge. In keeping with the historic planting of the bend in the Forebay and edge approaching the Bridge, deciduous trees will line the Forebay retaining wall. New stairs from the walkway/service drive to the new grass bank above the existing sanitary sewer will bring the visitor to the Forebay water's edge. Lighting and other elements will look to the 1870s period of significance--small twinkling lights characteristic of the Victorian era, represented by both the Water Works and Boathouse Row, rather than the high intensity and overall glow associated with more modern lighting schemes.

Major entrances to the Interpretive Center and the restaurant are assumed to be at the Caretaker's and Engine Houses. The emergency vehicle turning plaza in front of the Engine House will serve as the new forecourt for the Engine House, as outdoor space for both the Interpretive Center and the restaurant, and as a setting for special occasions. While the south garden path paving will match the 1870s brick, modern materials and character will be introduced diagrammatically to suggest lost features such as the garden in front of the Engine House. With the exception of that area, the South Garden can be restored to serve as an adjunct to the restaurant and Interpretive Center. Restoration of the sound and action of the missing fountains is not only critical symbolically, but also serves to mask the noise of the Schuylkill Expressway. A long range garden plan would include the restoration of statues, benches, lamps, trees and lawns, as well as the walkways and pavilions of the cliffside. The Distribution Arch and Standpipe Tower might be resurrected as garden ruins.

As in Schematic alternate C, the dam across the Forebay can be developed as an additional entrance/service access for future occupancy of the New Mill House.

### ADVANTAGES

1. Historic preservation: includes restoration of Bridge, Forebay Walls and south garden; nearly

full reintroduction of water into Forebay, except grass bank covering existing sanitary sewer.

2. Site interpretation: Distinction between intimate nature of Water Works site and grand scale of the Museum is maintained.
3. Connection to Park: In addition to traditional link across Old Mill House deck and Forebay Bridge, new access path provides strong link for pedestrians, joggers and bicyclists between the garden to the south and Fairmount Park to the north.
4. Occupancy: Intensive restaurant use at building near to access from public road; identifiable separate entrances and workable circulation systems for both restaurant and Interpretive Center.
5. Service Access: minimal requirements for remote Engine House
6. Parking: Limited number of spaces on Aquarium Drive and Fairmount Avenue are nearby.
7. Phased development: long-range use of site is anticipated with provision of service lift access at west end of Forebay Bridge. New Mill House available for restaurant expansion or other use.

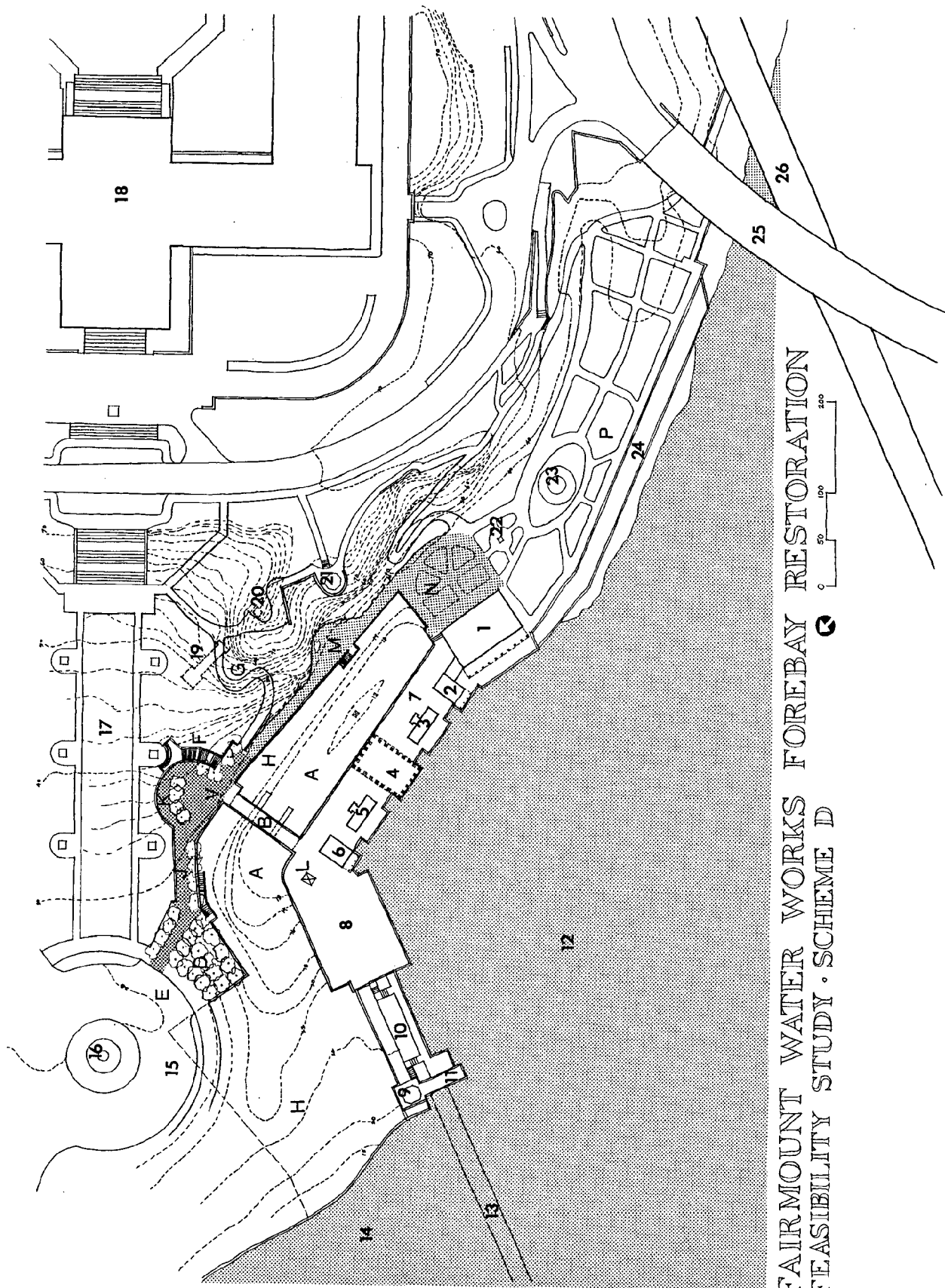
#### DISADVANTAGES

1. Alterations: new walk/emergency drive and retaining wall cut into hillside; fill disposal to be off-site.
2. Site interpretation: Confusion caused by introduction of emergency vehicles into Engine House forecourt.
3. Valet Parking: Museum lots are remote from drop-off.

## PHASE ONE: SCHEME D

As Phase One of the Forebay Masterplan, it is proposed partially to excavate the fill from the Forebay and to create a planting system that will suggest the original water, denoting the historic purpose of the site. Excavation at the south end and passing under the Bridge will be carried down to the original water level. A gradual bank along the edge of the New Mill House will rise from that level up to present grade, which will remain undisturbed at the outer Forebay. New stairs from the walkway/service drive to the new grass bank covering the existing sanitary sewer will bring the visitor to the edge of the wildflower meadow which will fill the place of and suggest the water. The Forebay Bridge will be restored to provide primary access for both visitors and off-hours service.

It is intended that no work will be done in such a way as to damage archaeologically sensitive areas, and it will be designed so as to encourage a future water feature in the Forebay as well as fountains in the south garden and behind the Engine House. As in the long-range Masterplan, it is hoped that the south garden can be restored to serve as an adjunct to the restaurant and Interpretive Center. Finally, work done for Phase I development shown in Scheme D will be consistent with the long range Masterplan and investment in construction which will eventually be removed is kept to a minimum.

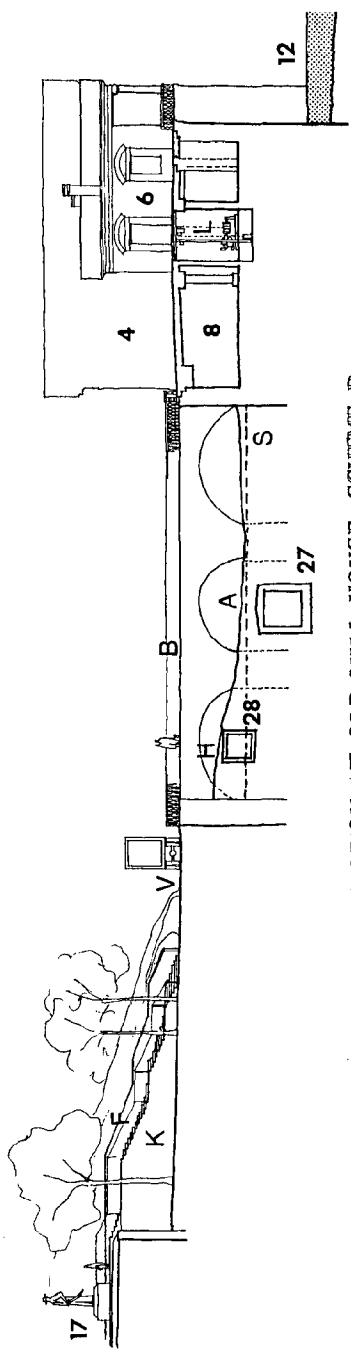


FAIRMOUNT WATER WORKS FOREBAY RESTORATION  
FEASIBILITY STUDY • SCHEME D

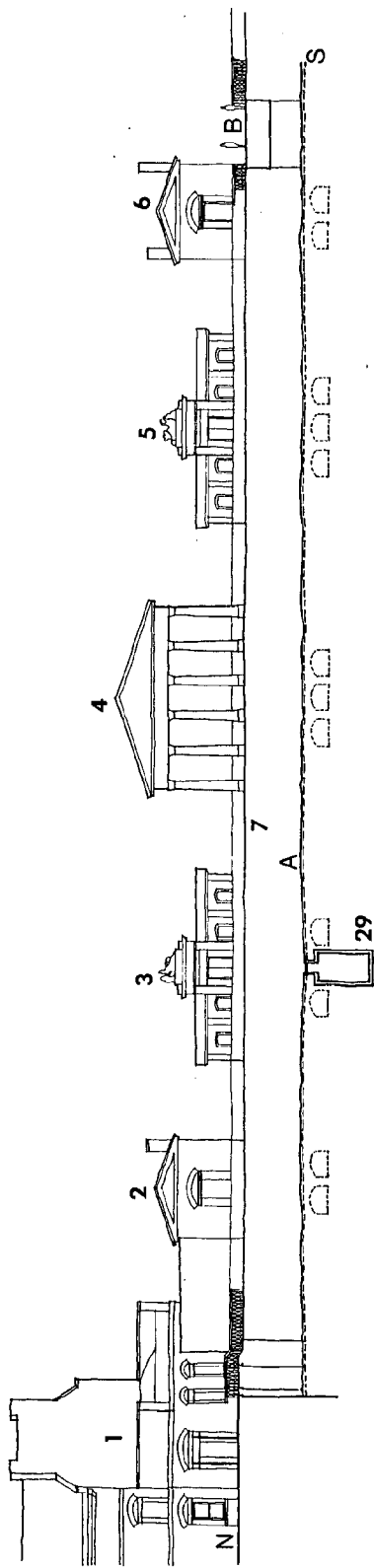
### Scheme D Legend

- 1 Engine House
- 2 Caretaker's Quarters
- 3 South Entrance House
- 4 Pavilion
- 5 North Entrance House
- 6 Watering Committee Building
- 7 Old Mill House
- 8 New Mill House
- 9 Gazebo
- 10 Lower Terrace
- 11 Fishing Pier
- 12 Schuylkill River (EL. +6.94)
- 13 Fairmount Dam
- 14 Schuylkill River (EL. +12.56)
- 15 Outline of Original Forebay (Shown Dotted)
- 16 Fountain of the Sea Horses
- 17 Reilly Memorial
- 18 Philadelphia Museum of Art
- 19 Site of 1860 Distribution Arch
- 20 Site of 1851 Standpipe Tower
- 21 Gazebo
- 22 Graff Memorial
- 23 South Fountain
- 24 River Esplanade
- 25 Spring Garden Street Bridge
- 26 West River Drive
  
- A Restored Forebay Planted with Wild Flowers
- B Restored Forebay Bridge
- D New Forebay Entrance Plaza
- E New Restaurant Valet Parking/Interpretive Center Drop-Off
- F New Path/Stair
- G Restored Existing Path
- H New Grass Bank above Existing Sanitary Sewer
- J New Access Road/Pedestrian Walkway
- K New Vehicle Turning Plaza
- L New Trash Area (Below Deck) and Service Lift
- M New Pedestrian Path/Emergency Vehicle Access
- N New Engine House/Emergency Vehicle Turning Plaza
- V New Ceremonial/Special Occasion Drop-Off and Deliveries

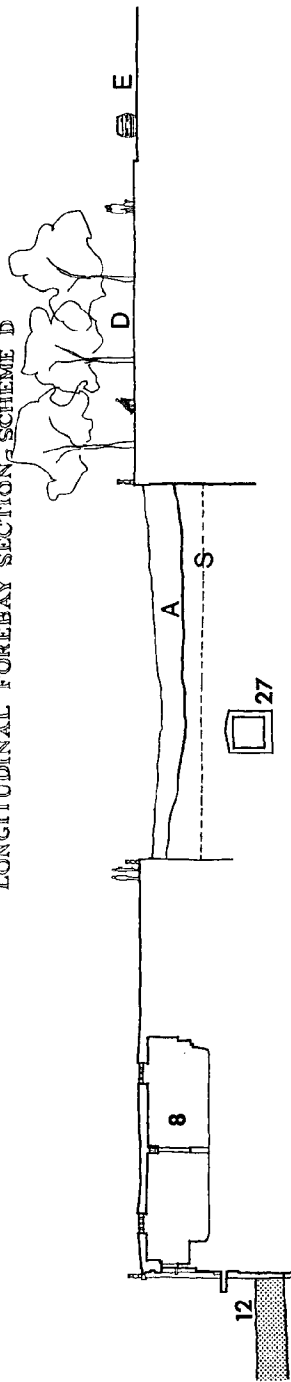
Note: Elevations are 7Ft. above City Datum



FOREBAY SECTION AT OLD MILL HOUSE - SCHEME D

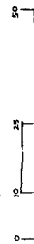


LONGITUDINAL FOREBAY SECTION - SCHEME D



FOREBAY SECTION AT NEW MILL HOUSE - SCHEME D

# FAIRMOUNT WATER WORKS FOREBAY RESTORATION FEASIBILITY STUDY



Scheme D Sections: Legend

- 1 Engine House
- 2 Caretaker's Quarters
- 3 South Entrance House
- 4 Pavilion
- 5 North Entrance House
- 6 Watering Committee Building
- 7 Old Mill House (Restored Existing Forebay Wall)
- 8 New Mill House
- 12 Schuylkill River (EL. +6.94)
- 17 Reilly Memorial
- 27 Existing Relief Sewer
- 28 Existing Sanitary Sewer
- 29 Existing Relief Sewer with New Inlet
  
- A Restored Forebay Planted with Wild Flowers
- B Restored Forebay Bridge
- D New Forebay Entrance Plaza
- E New Restaurant Valet Parking/Interpretive Center Drop-Off
- F New Path/Stair
- H New Grass Bank above Existing Sanitary Sewer
- K New Vehicle Turning Plaza
- L New Trash Area (Below Deck) and Service Lift
- N New Engine House/Emergency Vehicle Turning Plaza
- S Original Forebay High Water Level (Shown Dotted)
- V Ceremonial/Special Occasion Drop-Off and Deliveries

Note: Elevations are 7 Ft. above City Datum

## VIII. PROJECT BUDGET

Marianna Thomas Architects  
3961 Baltimore Avenue  
Philadelphia, PA 19104

June 25, 1990  
ICI #88161  
Sheet 1 of 3

FAIRMOUNT WATERWORKS  
FOREBAY  
SCHEMATIC COST ESTIMATE

The following information must be considered and used in conjunction with this Construction Cost Estimate:

1. Information used in the preparation of this Estimate includes:
  - A. Hexagon Limited site plan, dated June 14, 1990, received by ICI June 15, 1990.
2. This Estimate is based on mid-1990 construction unit prices. A construction cost escalation factor of five tenths of a percent (.5%) per month has been added on the Detail Sheet. Escalation of twelve percent (12%) has been developed using mid-1992 as the midpoint of construction.
3. The general contractor's overhead and profit are included in General Requirements, which is added following the Estimate Details.
4. No architectural, engineering, or project management fees are included in this Estimate.
5. No allowance has been made for a lift at the engine house.
6. No work has been included for the balustrade along the river side of the mill houses.



INTERNATIONAL CONSULTANTS, INC.

## ESTIMATE DETAILS

MARIANNA THOMAS ALBERT  
FAIRMOUNT WATERWORKS  
FORE BAY  
SCHEMATIC COST ESTIMATE

ICI NO.: 88161  
 PREP. BY: MCF  
 CHECKED BY: SKP  
 DATE: 6/25/90  
 SHEET NO.: 2 OF 3

ACCT	DESCRIPTION	QUANTITY	UNIT	AMOUNT
	SITE CLEARING	10,300	SY.	15,450.00
	DEMOLITION - PAVING	1950	SY.	11,700.00
	- ELEC. POLES / LIGHT POLES	6	EA	1,800.00
	- LARGE TREES	12	EA	3,600.00
	- CATCH BASIN / AREA DRAINS w/PIPE	9	EA	4,500.00
	- WALL UNDER BRIDGE	1800	SF	9,000.00
	- MISC. STONE WALLS / MISC. DEMO	FLG	-	18,000.00
	- FOREBAY ROOM	1	LS	25,000.00
	EXCAVATION - BULK	20,300	CY.	182,700.00
	- ROCK	1800	CY	90,000.00
	- FOUNDATION / TRENCH	3,500	CY.	43,750.00
	- BACKFILL / COMPACT	2,600	CY.	19,500.00
	ROUGH GRADING	10,300	SY.	7,730.00
	CONC. RETAINING WALLS - 14" THICK	635	CY.	222,750.00
	- FOOTINGS	385	CY.	63,530.00
	CONC. STEPS	720	LF	21,600.00
	CAST STONE-CLADDING WALLS - 6"	10,500	SF	393,750.00
	" " - COPING	1,130	LF	50,850.00
	BRICK PAVERS ON CONC SLAB	21,430	SF.	289,310.00
	CLEAN & POINT - EXIST. FOREBAY WALL	6,800	SF	40,800.00
	- " BRIDGE & SUPPORTS	3,800	SF	22,800.00
	REPAIR EXIST. MASONRY AS REQ'D	ALLOW	-	25,000.00
	RAILINGS / BALUSTRADE - C FOREBAY / BRIDGE	680	LF.	374,000.00
	DECORATIVE PIPE RAILINGS & RETAIN. WALLS	1145	LF.	286,250.00
	BOLLARDS / GATE / ETC CIRCLE	ALLOW	-	10,000.00



MARIANA THOMAS ARCHITECTS  
FAIRMOUNT WATERWORKS  
FORE BAY  
SCHEMATIC COST ESTIMATE

[illegible]

## IX. APPENDIX

- A. Statement of the Problem
- B. 1875 Narrative Description
- C. Historic Plans
- D. Historic Views
  - 1. Forebay and Bridge
  - 2. Cliffside Paths and Structures
  - 3. South Garden
- E. Questionnaires Completed by Project Participants

A. STATEMENT OF THE PROBLEM

Revised 11/8/89

## STATEMENT OF THE PROBLEM

### Introduction

The Fairmount Waterworks is one of the most visually prominent and significant historic sites in the City of Philadelphia, recognized as a national landmark. The combination of natural and man-made beauty with technological prowess made the Fairmount Waterworks one of the City's most visited sites. It is certainly one of the most visually documented locations in the Philadelphia area, having been featured in lithographs, paintings, photographs, and even on porcelain pieces. The Waterworks property was a favorite of 19th-century Philadelphians as a recreational spot. Promenades afforded the citizenry opportunities for healthful walks and socializing, and access to steamboat tours up the Schuylkill River. The location of the Waterworks spurred the development of Fairmount Park, and convinced the City to acquire the riverside "country seats" in order to safeguard the purity of the Schuylkill's water from industries which might locate upriver of the City's water supply.

The City of Philadelphia is presently undertaking the restoration of the Fairmount Waterworks. Most of the buildings are being rehabilitated for reuse as an interpretive center defining the history and significance of the complex. The latest phase of the project includes the restoration of the Forebay area and Bridge leading to the Waterworks buildings. This study encompasses most of the approaches to the buildings of the Waterworks from the Art Museum, Boathouse Row and Fairmount Park.

Historically, the Forebay directed water from the Schuylkill River upstream of the dam, to the east side of mill house, through which it would flow, powering the turbines and waterwheels, then spilling into the Schuylkill downstream of the dam. The Bridge provided access from the "mainland" Esplanade across the Forebay to the Waterworks facilities. The Forebay was filled in and the Bridge buried almost ten years after the Waterworks ceased operation early in the 20th century. Aquarium Drive was installed over the Forebay and Bridge, as it is seen today, to provide ease of access when the old mill house was adapted to an aquarium.

### Project Assumptions

The Feasibility Study called for in the Request for Qualifications will address the issues surrounding the restoration of this area and determine alternate schemes for the successful use of the Forebay and Bridge in its present and proposed future context. The location of the Forebay and Bridge as the principal approach to the buildings of the Waterworks demands that the aesthetic considerations be of major importance. The beauty of the historic site as evidenced by the numerous depictions in visual documentation can be realized again with the proper design relating to

present and proposed public usage of the site. Of prime concern, of course, are public safety as well as the proper protection of the historic fabric of the site in regards to fire, theft and vandalism.

The primary objective of the study, then, is to determine the best course of action to ensure that this nationally significant site is preserved, in the best possible setting, for the use and enjoyment of the citizens of Philadelphia and visitors from around the world.

The present condition permits limited viewing of a portion of the bridge and the wall of the Old Millhouse, which are exposed in the underground Forebay Room. We understand that previous archaeological tests dug to a maximum depth of 160 cm. indicate that soil was used as fill above that level.

#### Scope of Services

Under the leadership of Thomas & Newswanger Architects, the project design team will begin by reviewing existing measured architectural and historical documentation generated in previous phases of the Waterworks restoration project. Additional data will be compiled from the Water Department's utility plans and records, as well as original architectural and engineering drawings of the Bridge and Forebay. The Clio Group, historical consultants, will supplement this base data with additional archival research, to develop an understanding of the original physical appearance of the forebay, its function, and subsequent alteration. The historians' compilation of information will aid the architect, landscape architect, and engineers in developing viable alternatives for the reuse of the Forebay. At the appropriate time, as an additional service to the contract, they could also undertake mortar analyses to determine the composition of the masonry's original mortars, so that appropriate non-damaging new mortars can be specified for masonry repairs of the Bridge and retaining walls of the Forebay. Similarly as an additional service, Clio Group archaeologists could undertake archaeological studies and excavation prior to construction, in order to best determine and document existing underground conditions and artifacts.

We understand that the City will undertake a contract for excavation of the Forebay after completion of the work under this contract. The depth of the excavation will be determined based upon the schematic design recommendations furnished under this contract.

Project landscape architects, Hexagon, will collaborate with the architects to develop schematic designs and presentation materials to define the proposed reuse alternatives of the forebay, bridge and esplanade, with particular emphasis on the ground and water elements. The project structural engineers, Ang Associates, Inc., will assist in the schematic design and will prepare biddable documentation (i.e. grading plan, sections and technical specifications) for excavation of the Forebay area. They will also utilize Water Department records to determine the feasibility of relocating site utilities during the development of schematic designs. Michael Funk of International Consultants Inc., (I.C.I.), will work in close conjunction with the design team to develop a preliminary budget for the selected scheme for consideration by the Water Department and the Fairmount

## Park Commission.

Under the direction and coordination of Thomas & Newswanger Architects, project team members will undertake a Feasibility Study and Schematic Design for the Fairmount Waterworks Forebay. They will propose three schematic design alternatives, presented as sketch studies. They will proceed to prepare presentation materials, including 2 renderings and a model, of the alternate selected by the Water Department. The Feasibility Study Report will present the issues considered and the reasoning behind the three schemes, with particular attention to the selected alternate. In accordance with the project schedule, the team will make one preliminary and one final presentation to groups selected by the client. Permit applications, and associated hearings are not included in the scope of this contract. With one notable exception, project services under this Contract do not include Design Development, Contract Documentation or Construction Administration services as generally defined by the Architectural profession. The exception is the preparation of biddable documentation for excavation of the Forebay area, which will be provided by Ang Associates, Inc..

It is understood that the biddable documentation (i.e. grading plan, sections and technical specifications) prepared by the professional design team will be incorporated by the City into the excavation contract, along with the "Standard Contract Requirements for Public Work Contracts." Specifications for shoring and protection of the excavation will be prepared by and issued under the professional seal of an engineer serving as an employee of or consultant to the Contractor selected to perform the excavation. Structural analysis of the condition of the Forebay walls and Bridge are not included in this contract, except of those portions which are currently visible from the underground Forebay Room.

B. 1875 NARRATIVE DESCRIPTION

## A CENTURY AFTER:

### Picturesque Glimpses of Philadelphia & Pennsylvania

Edited by Edward Strahan  
Allen, Lane & Scott & J. W. Lauderbach  
No. 233 South Fifth Street  
Philadelphia, PA  
1875

We are going to achieve what no human being has yet accomplished. We shall explore the Park; and, without waste of time or returning on our own literary steps, as it were, we shall contrive to see all the "lions." It is unnecessary to say that no merely mortal explorer ever achieved a promenade so productive.

The hardest pedestrian, exhausting the longest summer day, comes home footsore, and asked if he noticed this or that, answers wearily: "No, I was tired, and brought up half-way. The Park is impenetrable."

But no limitations of time or endurance need hinder our description. It shall be an Asmodeus, of which the crutches are pen and pencil; its passage may be limping, but it shall be tireless; and its eyesight shall pierce not alone through Asmodeus's roofs, but through the earth itself sometimes, to discover the lessons of life or the memories and secrets of the grave.

The site of FAIRMOUNT PARK was prophetically marked out for feats of landscape-gardening. Some Edens are predestinate. The Adam of this new region, PENN himself, said in 1701, "my eye is on Fairmount." He meant to build his manor there. And certainly no site for a Governor's park could be so attractive as the graceful little mountain, the first eminence that met the pioneer's eye in ascending the beautiful Schuylkill.

Long after this -- yet also long before its acquisition as a city pleasure-ground -- the adjacent knoll became one of the typical gardens of America. As "Pratt's Garden," the estate now merged in the Park, and localized as "Lemon Hill," attracted the botanists of fifty years ago. The late Mr. A. J. DOWNING -- that artist in living landscape, whose pleasant destiny it was to cover the country with gardens -- tells of this American Versailles, awarding it praise and prominence in his quietly-enthusiastic manner. Speaking of the spot in 1841, in the celebrated work he has left on Landscape-Gardening, he mentions it as "a familiar example of the Geometric style;" and goes on to inventory the quaint, "Pratt's Gardens, when in their perfection some ten years ago," he observes, "were filled with a collection of the rarest and most costly exotics, as well as a great variety of fine native trees and shrubs, which, interspersed with statues and busts, ponds, jets-d'eau, and water-works of various descriptions, produced certainly a very brilliant though decidedly artificial effect. An extensive range of hot-houses, as well as every other gardenesque structure, gave variety and interest to this celebrated spot."

The scene thus extolled is obliterated at present among the attractions of a vastly larger domain; but it is well to remember that, near the entrance of FAIRMOUNT

PARK, there is included, as a mere contracted nucleus, an earlier masterpiece; a plot which, after having served as an estate for the Revolutionary financier, became in our fathers' youth the most elaborate garden in the country.

FAIRMOUNT PARK is unique in America in one respect. Every foot of ground teems with association. It is no raw creation, laid out in an inert and sleeping suburb, far in advance of a city's march of improvement, and ignorant of a history. Long before we were a nation, this garden was trodden by footsteps that are now historic; its very sods are sensitive; they vibrate to the memories of near two hundred years.

The name of "FAIRMOUNT PARK" now extends its defining outline around the enormous landscape to the north and west, though the cognomen "Fairmount," in the minds of old-fashioned citizens, applies more expressively to the basin and little garden connected with the water-works. We shall soon take leave of "Fairmount" in its restricted sense, to make acquaintance with "Fairmount" at large.

The scene we are about to explore contains nearly three thousand acres, divided by the river Schuylkill into the East and West Parks. We begin with the East Park. We tie up the thongs of our walking-boots, and with stout heart we begin the exploration.

At once we step back half a century as we enter the trim little gardens that basks at the base of Fairmount Basin. Everything is in the taste of 1822, the year when the water-works were put into operation. Steam was used for a few years anterior to the completion at that date of the dam and the large wooden water-wheels; the latter are now yielding to turbines, with an ultimate pumping capacity of twenty-four thousand gallons a day.

Straight, narrow pathways lead to the fountain, to the prospect-houses and belvederes, to the wheel-houses and race. The art of that day was very Greek indeed, and we constantly find ourselves in porticoes and peristyles that are ultra-Athenian in pattern, while the material is as carefully restricted to wood as they say were the earliest huts of the Greek builders. As an exception, the bust of Graff, the engineer who designed this Marly, is set up under a monument of Gothic design, an elegant little canopy in white marble. A few statues stud the grounds: that of Leda with her swan, whose slender jet falls into the forebay near the stand-pipe, is an American antique. It was at first the ornament of the old water-works, on the site of the present Municipal Buildings, and was modeled to represent Miss Vanuxem, a reigning belle of the day. William Rush, an ingenious carver of figure-heads for Philadelphia's infant marine, executed the statue; from the same hand are the images of Wisdom and Justice (ornaments originally placed on a triumphal arch for Lafayette's reception in 1824) which now occupy the Saloon. Do not be shocked if you perceive a certain chilly atmosphere while contemplating them; from those wooden faces twenty centuries - of weeks - look down upon you; and the Saloon used to be the engine-house of the works.

Near by, in the waste of waters outside, the pouring sheet of foam falls over the dam, and the surplus water from the pumps rolls into the Schuylkill again from the low arches at the rivers edge. Here the finny tribes of the stream congregate - the cat-fish and rock-fish, the golden carp long ago escaped from garden ponds near by and multiplied since, and the black bass, newly introduced by pisciculture; and here, among others, idle gentlemen of independent fortune assemble to angle for them, precisely as similarly-situated Isaak Waltons fish perpetually from the bridges of Paris. The same faces are seen day by day as this group of city sportsmen.

The river-side buildings, with the circular summer-house at the breastwork, and the intermediate place of shelter with the large round columns -- at which the lazy visitors tap idly, as at the wires of a gigantic bird-cage -- are all in the pseudo-classic pattern, the pattern that our French visitors know as the style of the First Empire. But the border of Old Fairmount Park away from the river, that which skirts the reservoir, shows another order of forms, and very sturdy and cyclopean they are. The rocky side of the basin overshadows the visitor as he enters the garden, and nods frowning above his head; the stony ravines which cleave the hill are spanned -- where the pathway winds up in zigzags -- with gloomy and humid arches, doubled and mounted on each others' shoulders, and altogether as grim-looking as the grottoes and caves in "Boboli's ducal bowers." High above them, just like one of the square bell-towers of Florence, rises an imposing structure -- in the merciless language of prose, a stand-pipe; a causeway leads up to it from the hill, over a circular arch and so rich and harmonious is the design of these utilitarian structures, that the tower and vine-hung system of arches and terrace-walks appear altogether like an illustration of Turner's for the hourney of Childe Harold. Italy itself is not always so Italian-looking.

We dwell on these details -- among which every step makes a picture -- to point out how compact and architectural are all the features; so different from the garniture of some parks, made up principally of structures in rustic-work that bristle like porcupines with fibres of dead bark, and look generally like straw ornaments of "what-not." Among these ponderous edifices, built for use yet turned to ornamental account, the artist is tempted to fill his sketch-book with effects, and forgets to wish for Europe. The diagonal edge of shadow under a great arch, the iron gloom of native rocks, the trail of vines in a steep gully down which an unraveled rivulet is depending, the square cut of a tower whose cornice, almost a hundred feet above the river, drives into the sky like a chisel, -- these are grouped in a way that might tempt foreign artists from abroad, rather than allow our own to go thither for their themes.

We clamber up the zigzags, -- it is the beginning of what our muscles are to pay for this exploration, -- and arrive at the summit of the basin, partitioned into several reservoirs.

From the eminence of Fairmount Basin the pedestrian can throw his comprehensive glance, not merely upon the many-bridged Schuylkill, but likewise upon the features of the land. Toward the westward the view extends across the river to the crest of Belmont, whose tufts of hemlocks are planted at a height of two hundred and forty-three feet above the tide water. Old Fairmount Garden lies immediately beneath; the space just to the north, between the Basin and Green street, is laid out with straight walks, fountains and resting-places, in the style rather of a Square than a Park, and forms a suitable introduction to the meandering avenues and wild beauties of East Park. To the eastward lies the city, with its spires and domes, among which are conspicuous the cupola and cross of the Cathedral, and the group of temples at Broad and Arch streets, as well as the fluted shafts of Girard College.

The rim of the basin is so extensive as to afford not one, but many, points of observation, and a still greater variety of views is obtained from the terrace or observatory connected with the adjacent stand-pipe. The purpose of this observatory is by no means restricted to ornament; its massive pier conceals the pipe through which water is pumped to fill the stand-pipe just by, whose great elevation secures a flow into the upper stories of the city mansions: as the visitor paces the fine level causeway of the observatory, the rush and pulse of a great arterial system of water-supply is going on incessantly beneath his feet.

We pause and loiter on the elevation, loth to descend from the eminence of so enviable an outlook. Other visitors are pausing also, -- reading books in the arbors, watching the racing-shells upon the river, or catching on their brows the fresh hemlock-scented breeze. There are those, too, who consider an arbor on a hill the very place for a little quiet flirtation, as if privacy was nowhere so certain as in such a spot. But getting up on a pedestal is never the safest way to avoid being seen, and the doings on the hill-top may come to be proclaimed on the house-top. Of all cruel betrayals, however, of love's blind confidence, there is nothing to compare with the revelations that sometimes have been made by the camera-obscura, in the neighboring pleasure-grounds at Lemon Hill. Fred and Georgiana, straying from a croquet-party, have just discovered a pretty nook in the shrubbery; Fred's arm -- after much hesitation and desperate plucking-up of courage -- has found a sort of orbit in which to surround the waist of Georgianna; when lo! from the terrible lens of the camera, a complete picture of the transaction is projected on the field of vision; the cynical instrument has recorded the whole sweet comedy, for the benefit of disrespectful and scoffing spectators. It seems too cruel a thing to do; but there is no reporter or interviewer so utterly unfeeling as the camera-obscura, and if you will take Georgianna there yourself, it will do it again.

The idlers at the base of the reservoir, however, are more abundant than those at its top. On fine days the garden, with its saloon, porticoes, and summer-houses, is thronged; nurse-maids and holiday servant-girls, in startling magnificence of costume, gather wisdom by inspecting the machinery in the wheel-houses. The rock-fish and black bass and whiskered "catties," biting with considerable keenness at the bait of amateur fishermen, make the scene a lively one around the dam, both for themselves and for the spectators. The neat little steamboats at the landing (there are five of them now built) are heavily freighted with excursionists. Children are devouring gingerbread and getting into mischief. It is the Tuileries Garden as contrasted with the Bois de Boulogne. It is domestic and humble, -- a sort of big open-air nursery; the pomps of equipages, and procession of fashion, are to be found in the freer portions of the Park.

The driving begins at the Green street entrance, skirst the promontory of Lemon Hill, and pours forth over Girard Avenue Bridge into the ample latitude of the West Park. As we descend from the Reservoir and proceed northwardly, we are soon involved in the stream of smoothly-bowling carriages; but since we are pedestrians, we may indulge ourselves with a more leisurely view of things than their occupants can enjoy. In a fine open space between the East Park main drive and the river drive, not far from the Brown street gate, we are struck by the great monument to Lincoln, a structure thirty-two feet high.

Hereabouts is the sole chalybeate spring known to visitors of Fairmount Park. A many-colored Moorish structure, like a kiosk, surmounts the fount and its drinking-vessels, and here, as at "Hathorn" or "Congress," in Saratoga, we may see daily drinking the few enthusiasts who adopt the iron-flavored water as a regimen. Every stranger, as a matter of course, tastes the fountain on finding himself in the neighborhood, on the principle we all blindly follow, that anything nauseous must be somehow good for the soul. It is likely that the spring was known to William Penn himself; his farm of Springettsberry lay hereabout, and he probably alluded to this fountain in a letter wherein he says: "There are mineral waters, which operate like Barnet and North Hall, that are not two miles from Philadelphia." The water is medicinal enough, doubtless; but it is almost a satire to include such a dose of physic in

a great pleasure-ground. The true medicines of the Park are Exercise, Recreation, Air, Beauty, and healthy Fatigue and the owner of a good horse, or a sound pair of legs, who will come and take these delicious remedies every day, will have no need of the mineral spring.

A short distance within the Green street gate is the Art Gallery, wherein a sufficiently interesting collection of paintings and statuary is always kept up. It is hardly necessary to describe an enterprise now in its infancy, a collection constantly changing, and a gallery which at present is but an earnest of what it is meant to be in the future. Many thousands of visitors, however, have already blessed the day when the idea of this local Louvre took effect, enabling them without trouble or further journeying to get admission to such fine gallery-pictures as Rothermel's "Gettysburg," Pauwels' allegory of American Immigration, and other important works, to say nothing of interesting retrospective sketches, such as Birch's painting of the hill of Fairmount, as it appeared before the establishment of the water-works. The Fairmount Park Art Association is a body of disinterested citizens who give their time and means to collecting artistic monuments for the decoration of the Park, and to establishing a standard of taste for the proper discrimination and arrangement of such objects as may be offered. They have shown what they can do in the way of eliciting funds, by obtaining donations amounting to such figures as ten and twelve thousand dollars per year: the statue of "Penserosa," and the bronze group of "The Dying Lioness," by Wolfe, of Berlin, have been purchased. A contribution of twenty bronze cannon was made to the Association by Congress, in June 1874, as material for an equestrian statue of General Meade. May the cultured gentlemen who unite to form the body keep their standard high, and admit no Art into this peerless landscape that shall form an insult to the beautiful Nature around!

We are still lingering near the entrance, and, in point of geographical extent, have as yet covered absolutely nothing of the Park. The eminence of Lemon Hill is just before us; opposite, on the other side of the river, and likewise within the Park, is Solitude, formerly the home of John Penn, grandson of the Founder of our State.

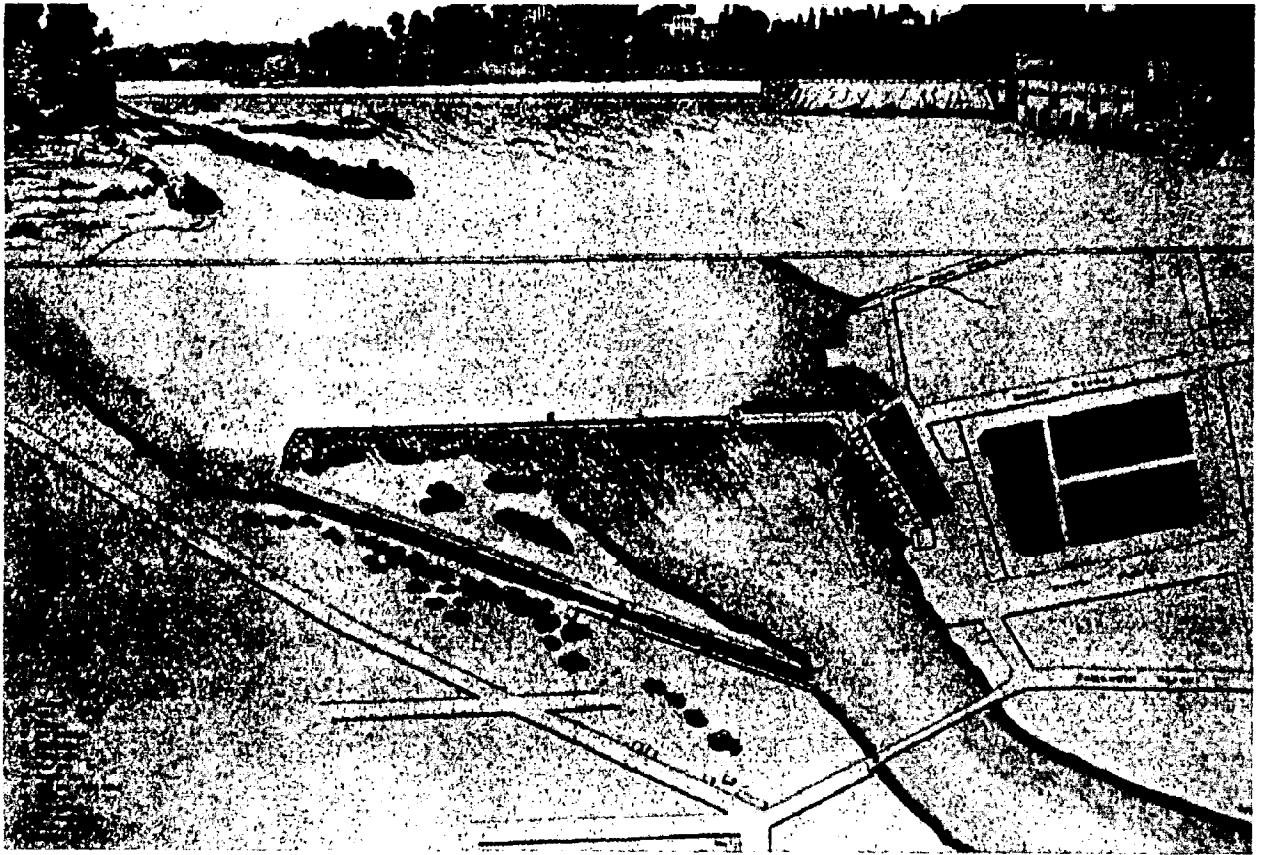
The various portions of the pleasure-ground are still designated by the names of the private estates which went to compose it, such as The Hills (or Lemon Hill), Solitude, Sedgeley, Fountain Green, Mount Pleasant, Rockland, Belleville, Ormiston, Edgeley, Woodford, Strawberry Mansion, Sweetbriar, Lansdowne, George's Hill, Belmont, Ridgeland and Chamouni: so numerous are the individual interests which must be sacrificed when a city gives a present of three thousand acres to the public. The circumstances under which the scheme took its rise, and was gradually prepared for, are curious enough, and date back to the location of the hydraulic works at Fairmount.

Up to the establishment of these works, in 1822, the Schuylkill had attracted many wealthy citizens by its singular beauty, and its waters laved the finest residences of the post-Revolutionary period. The various notables who lived on its banks will be mentioned as we describe the successive estates, while societies of gourmands met upon its shores to fish and to feast, with infinite jest and humor, and quaint affectations of mystical brotherhood. It was for a long time the chosen locality of the rich, who found in its endless resources a gratification for every kind of taste, and the attractions of a perpetual watering-place. The operations of 1822, however, changed the face of affairs: the breastwork thrown from bank to bank to dam the water, altered the whole character of the river as far up as the cataract of the Falls of Schuylkill; the latter was suppressed, and is now only a tradition: the channel filled up, and the river became a

sort of lakem a great deal broader than formerly, and almost deprived of a current. The last-named feature, which is so favorable to the regattas of the Schuylkill Navy, was anything but a welcome one to the residents of the river-side mansions.

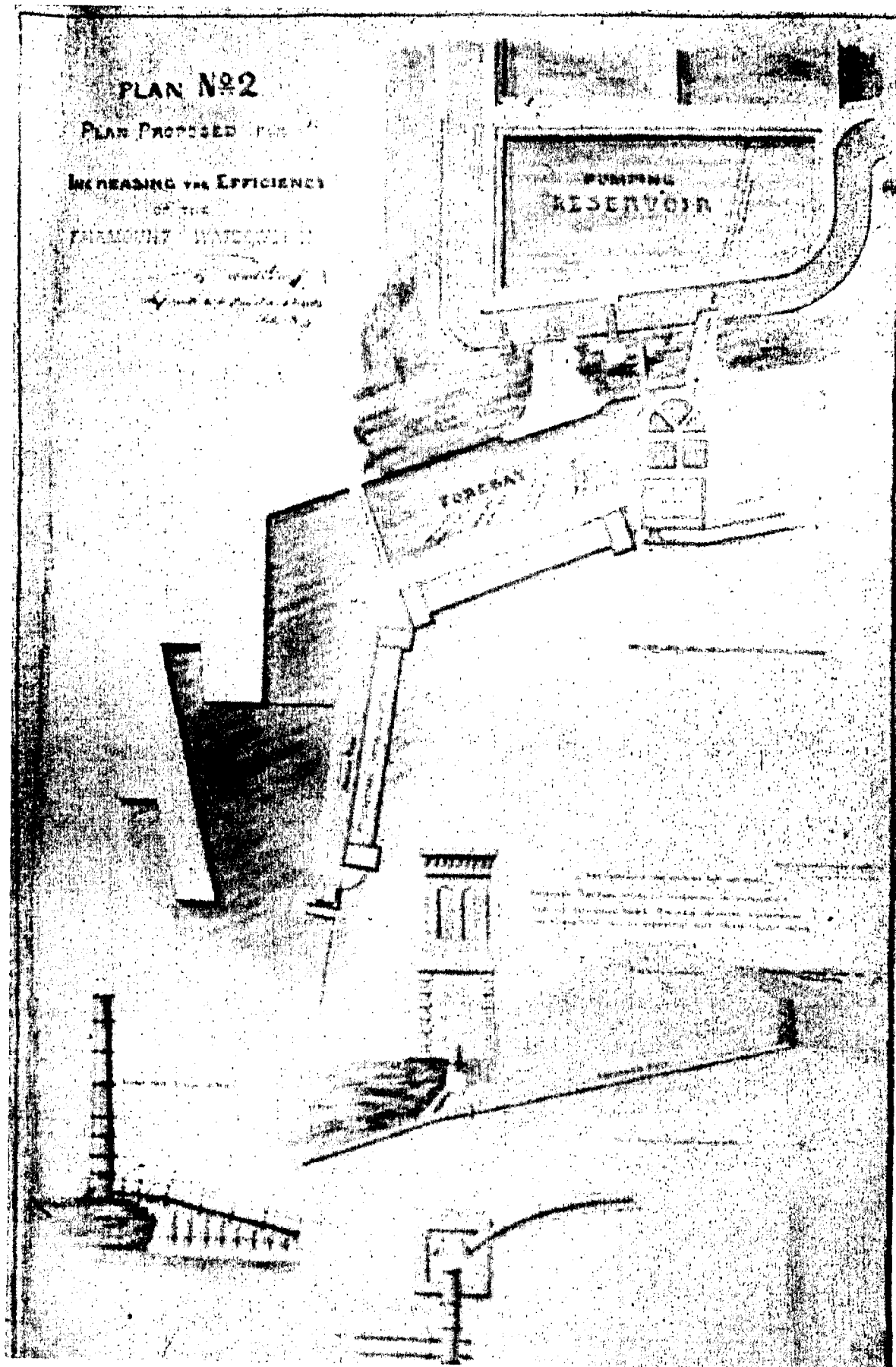
(Extracted from pages 21 through 33)

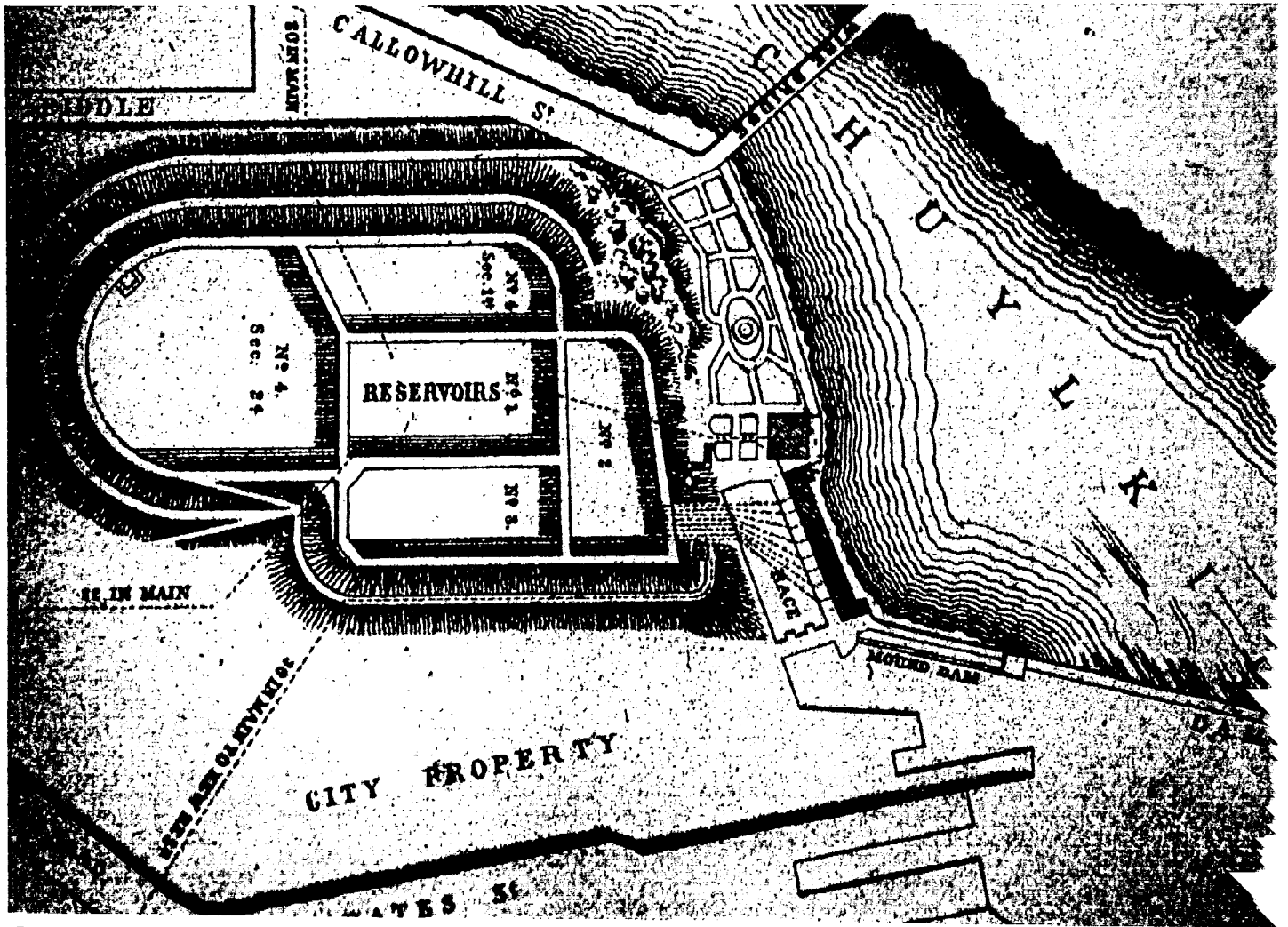
C. HISTORIC PLANS

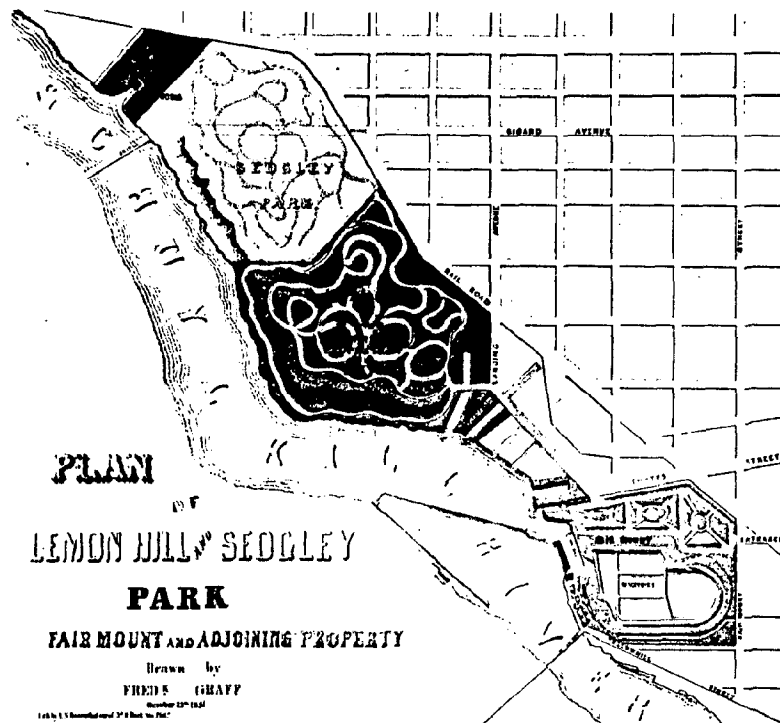


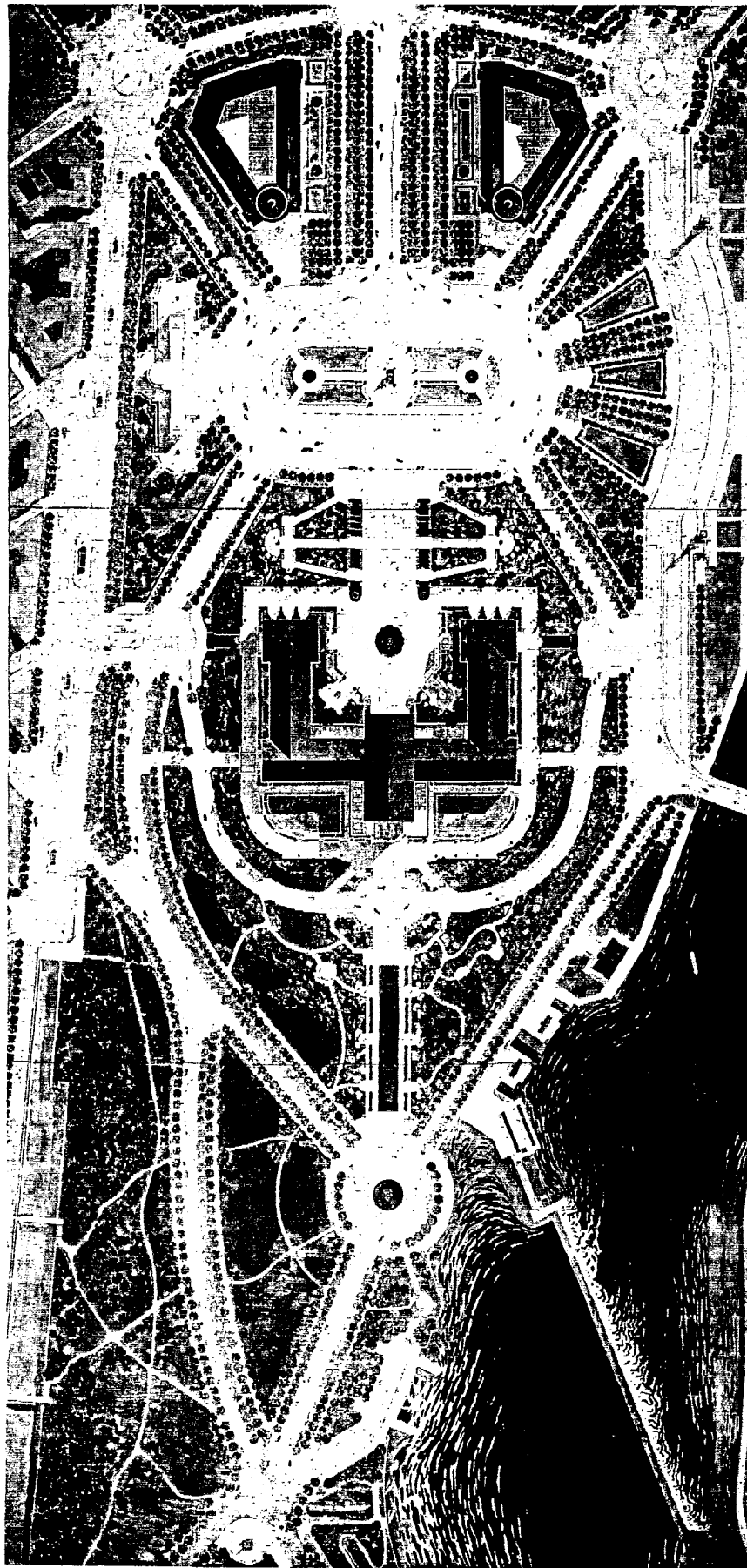
PLAN PROPOSED

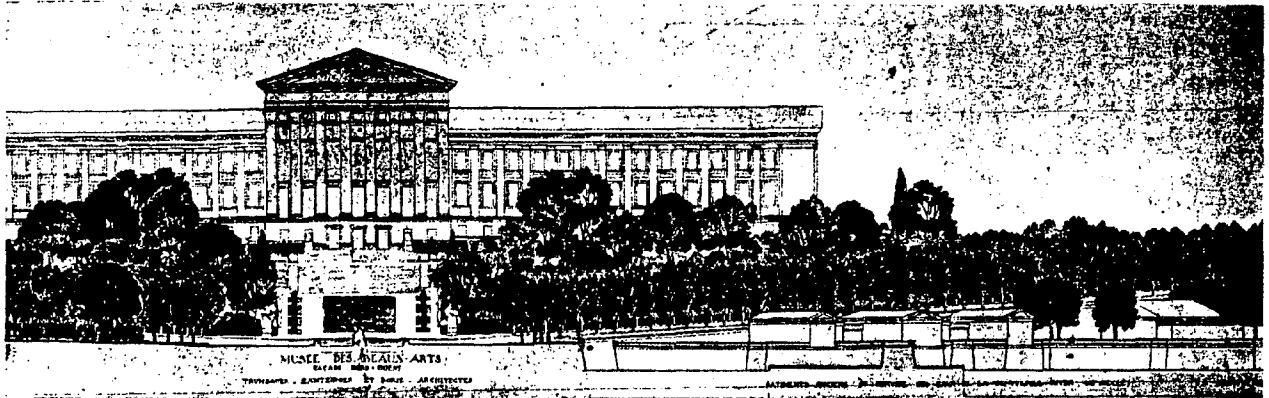
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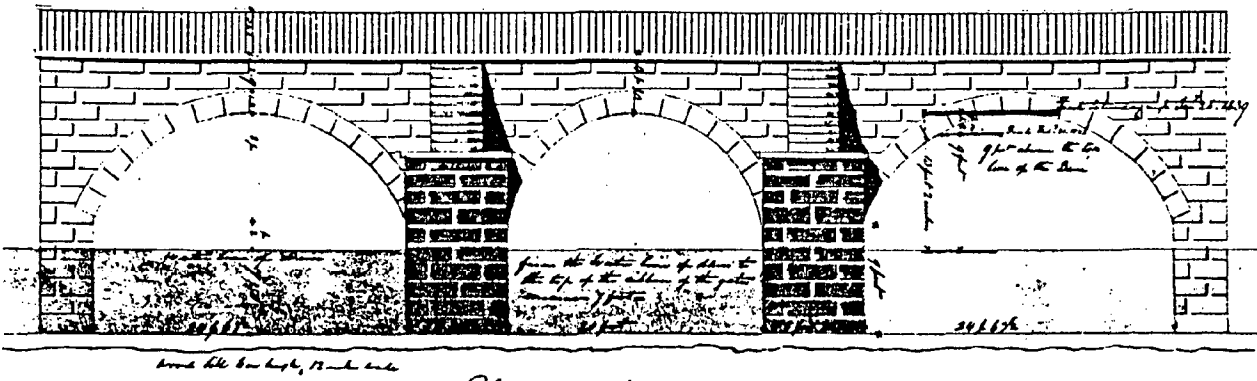




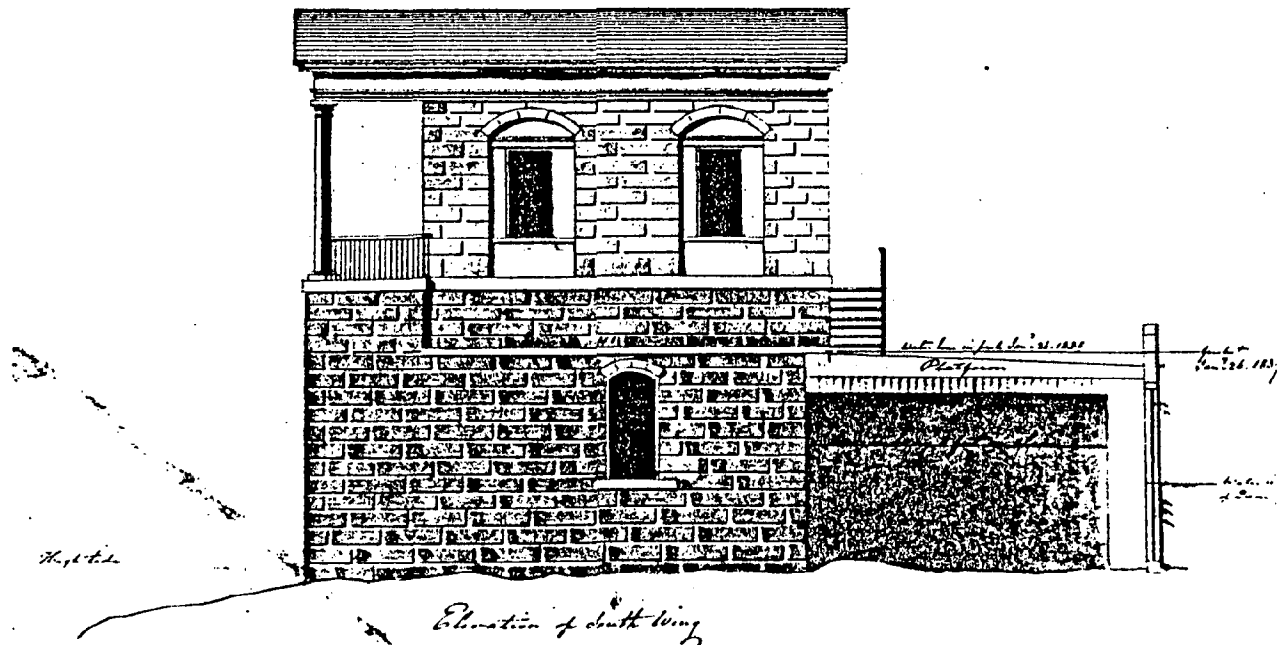








*Elevation of head archway.*

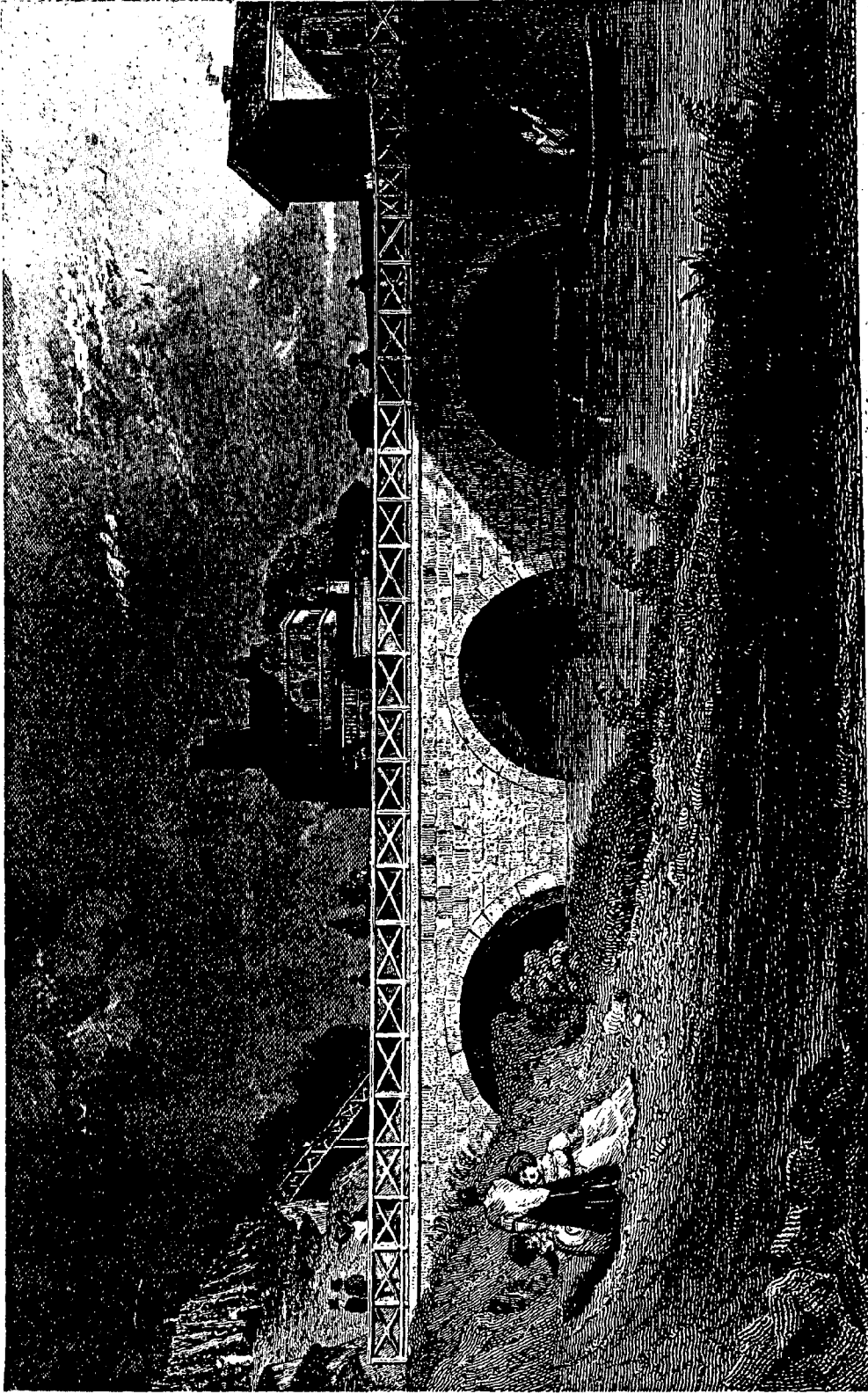


*Elevation of south wing.*

## HISTORIC PLANS

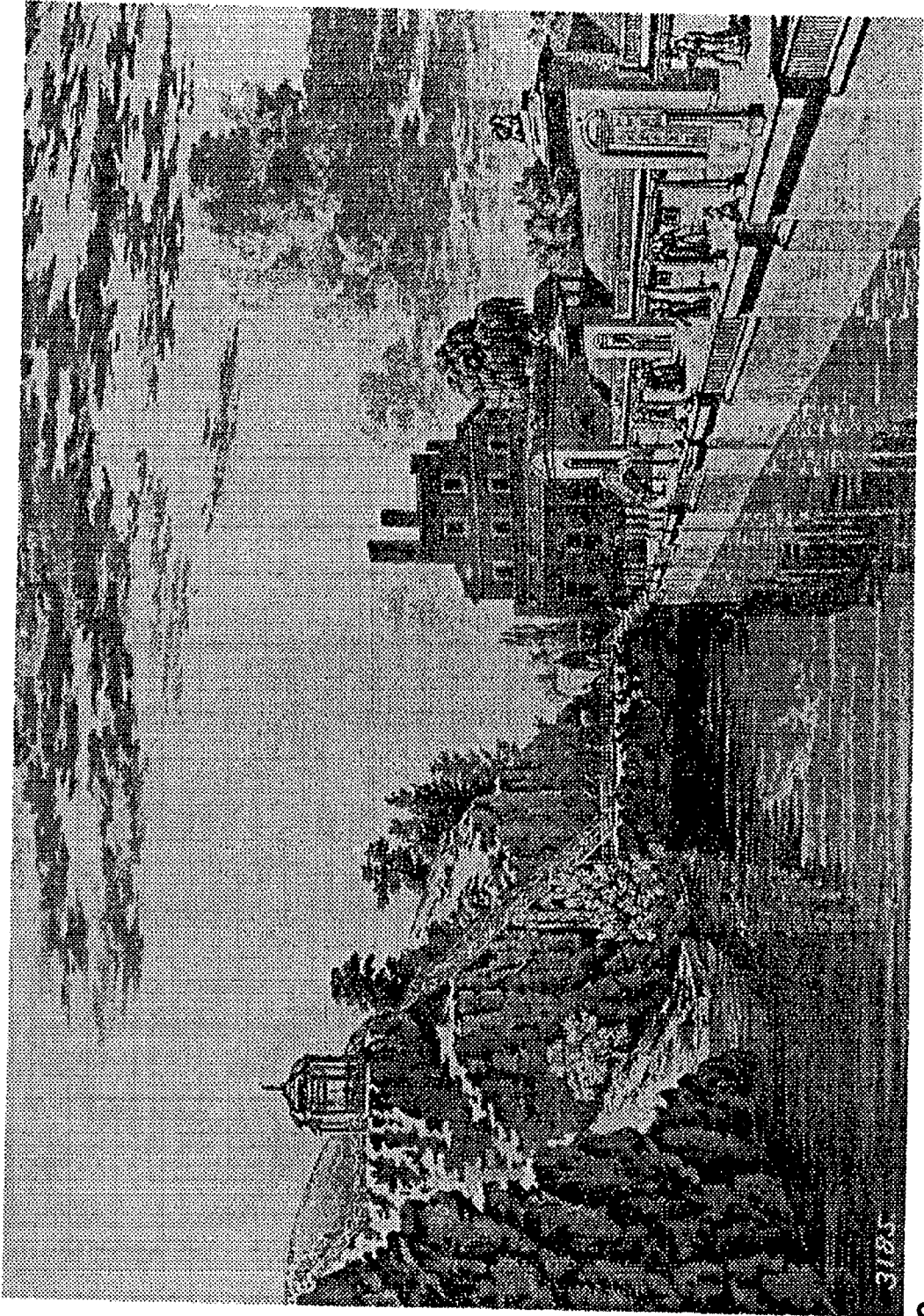
1. **PLAN OF WATERWORKS BEFORE 1824; EARLY ROADS AND SITE PLAN**  
ROBERT TILLER (ACTIVE PHILADELPHIA, 1818-24), ARTIST, AFTER THOMAS BIRCH (AMERICAN, BORN ENGLAND 1779-1851) GROUND PLAN & ELEVATION OF THE FAIRMOUNT DAM AND WATERWORKS, 1822, (IN THE REPORT OF THE WATERING COMMITTEE TO THE SELECT & COMMON COUNCILS OF THE CITY OF PHILADELPHIA, 9 JANUARY 1823) ORIGINAL ENGRAVING FROM COLLECTION, J. WELLES HENDERSON.
2. **DOCUMENTATION OF FOREBAY AND MISSING ELEMENTS**  
HISTORIC DIAGRAM SHOWING HEIGHTS OF RESERVOIR, DAMS & STANDPIPES, 12 SEPTEMBER 1894, COLLECTION OF PHILADELPHIA WATER DEPARTMENT.
3. **LANDSCAPE PLAN OF SOUTH GARDEN AND FOREBAY, PRE 1852**  
FREDRICK GRAFF JR., ENGINEER, PETER S. DUVAL, ARTIST, MAP OF FAIRMOUNT: SITE PLAN OF WATERWORKS WITH ELEVATION AND PLAN OF THE MILLHOUSE AND SECTION OF DAM, 1851-52, THE FRANKLIN INSTITUTE SCIENCE MUSEUM.
4. **LANDSCAPE PLAN, SEDGLEY TO WATERWORKS**  
FREDRICK GRAFF JR., ENGINEER, PLAN OF LEMON HILL AND SEDGLEY PARK, 13 OCTOBER 1851, FRANKLIN INSTITUTE SCIENCE MUSEUM.
5. **DOCUMENTATION FOR 1919 CHANGES TO SITE FOR PARKWAY**  
JACQUES GREBER, PLAN, THE PARKWAY FROM FAIRMOUNT TO LOGAN SQUARE, c. FEBRUARY 1919; FROM BROWNLEE, DAVID BRUCE: BUILDING THE CITY BEAUTIFUL THE BENJAMIN PARKWAY AND THE PHILADELPHIA MUSEUM OF ART (PHILADELPHIA: PHILADELPHIA MUSEUM OF ART, 1989), p. 36.
6. **AQUARIUM DRIVE, SLOPE FROM SEA HORSE FOUNTAIN CIRCLE TO SPRING GARDEN BRIDGE**  
JACQUES GREBER, THE PENNSYLVANIA ART MUSEUM NORTH WEST FACADE ELEVATION, FALL 1917; FROM BROWNLEE, DAVID BRUCE, BUILDING THE CITY BEAUTIFUL THE BENJAMIN PARKWAY AND THE PHILADELPHIA MUSEUM OF ART (PHILADELPHIA: THE PHILADELPHIA MUSEUM OF ART, 1989), P. 33.
7. **DOCUMENTATION FOR BRIDGE DESIGN, SHOWING BELOW GROUND PORTIONS**  
PLAN OF GRAFF'S HEADARCH, c. 1839, COLLECTION OF PHILADELPHIA MUSEUM OF ART.

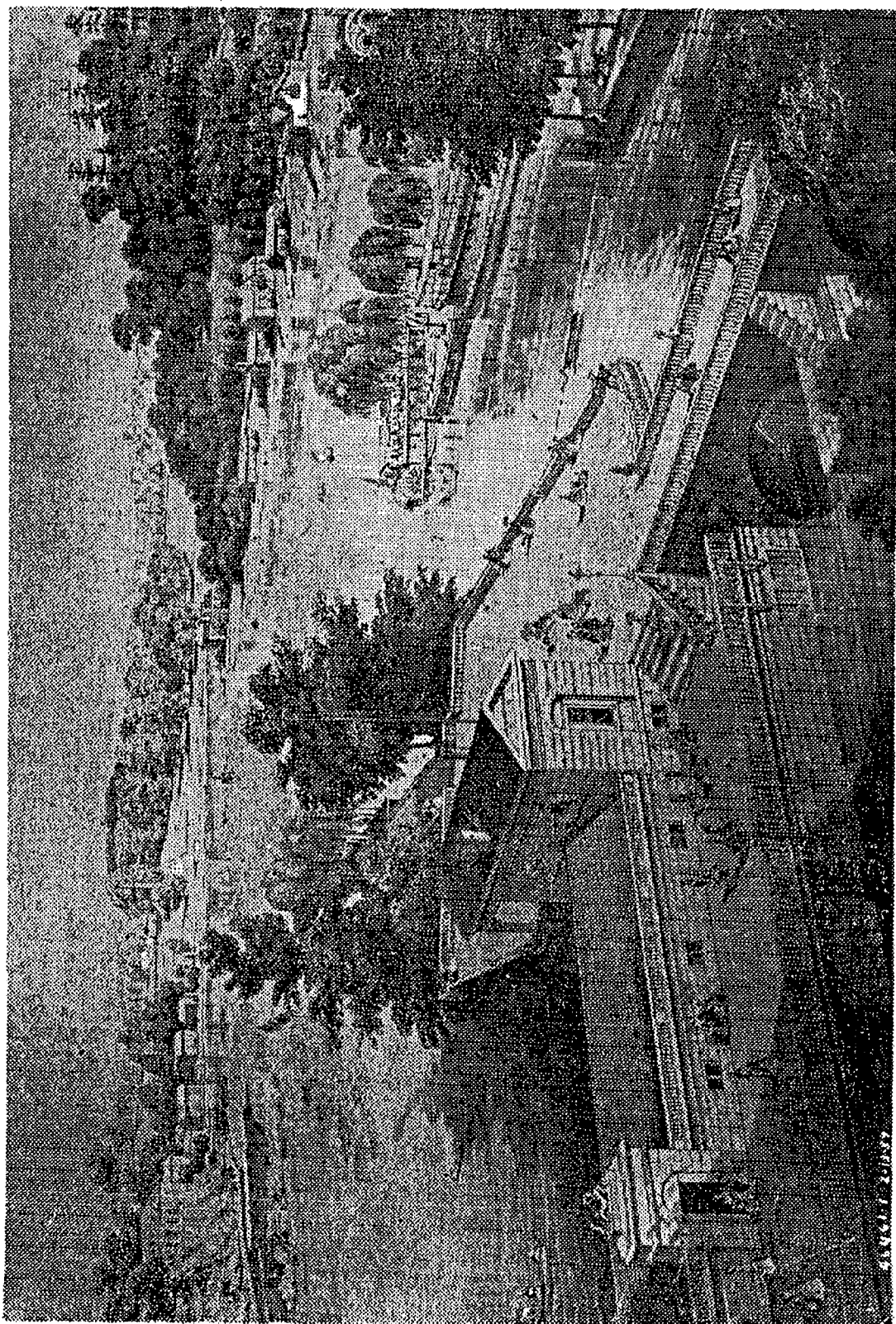
D. HISTORIC VIEWS

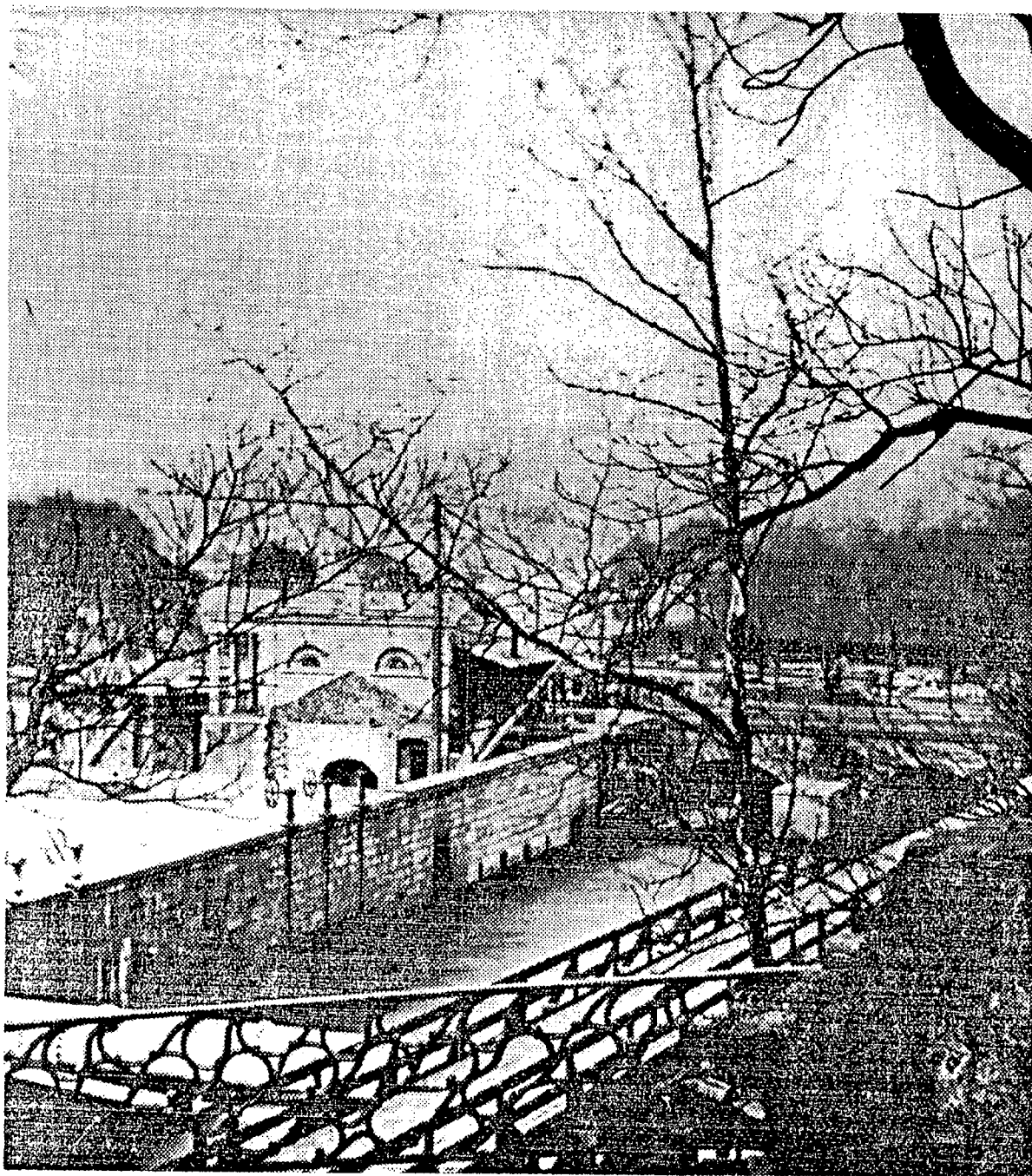


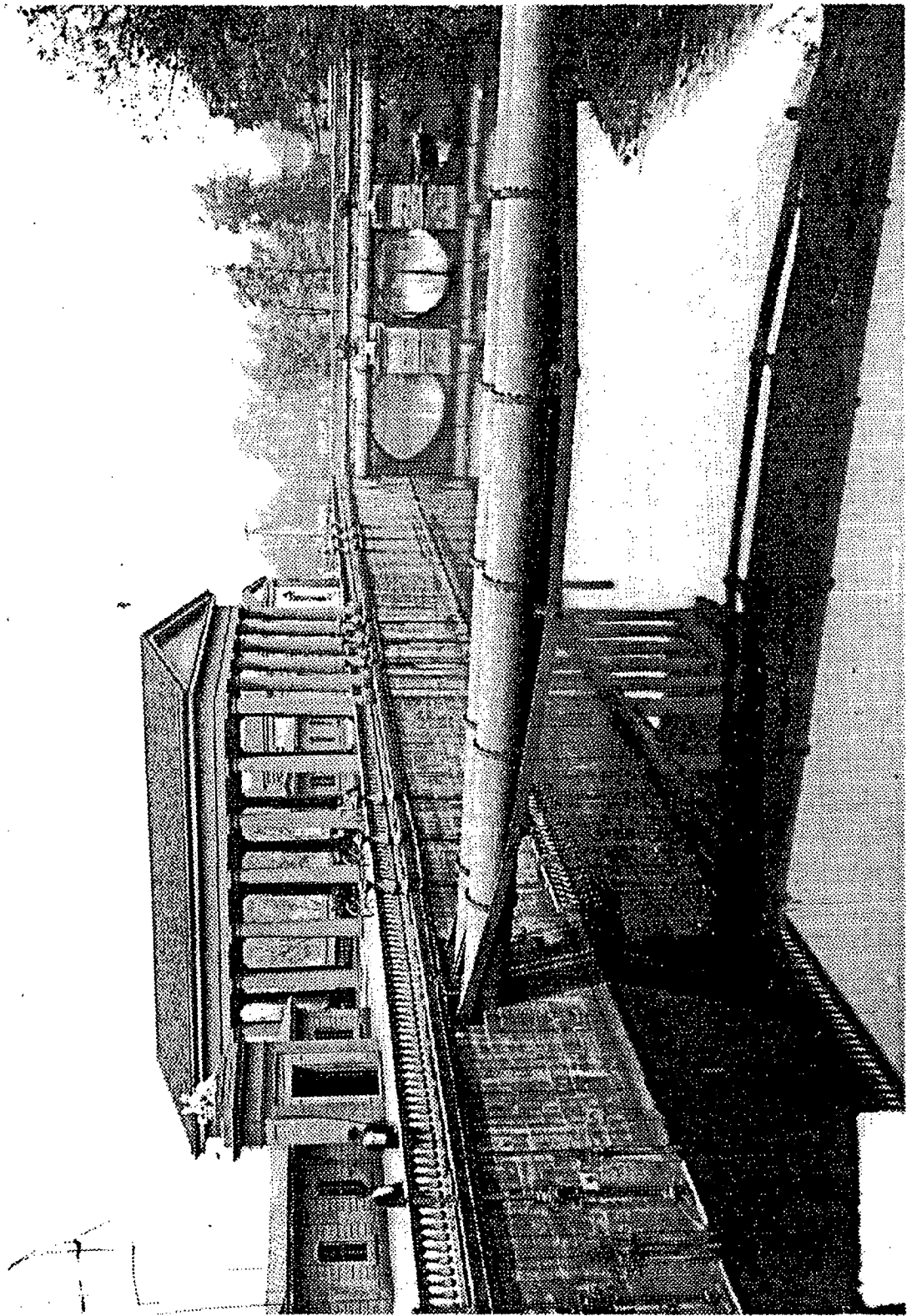
Engraved by  
R. T. Smith

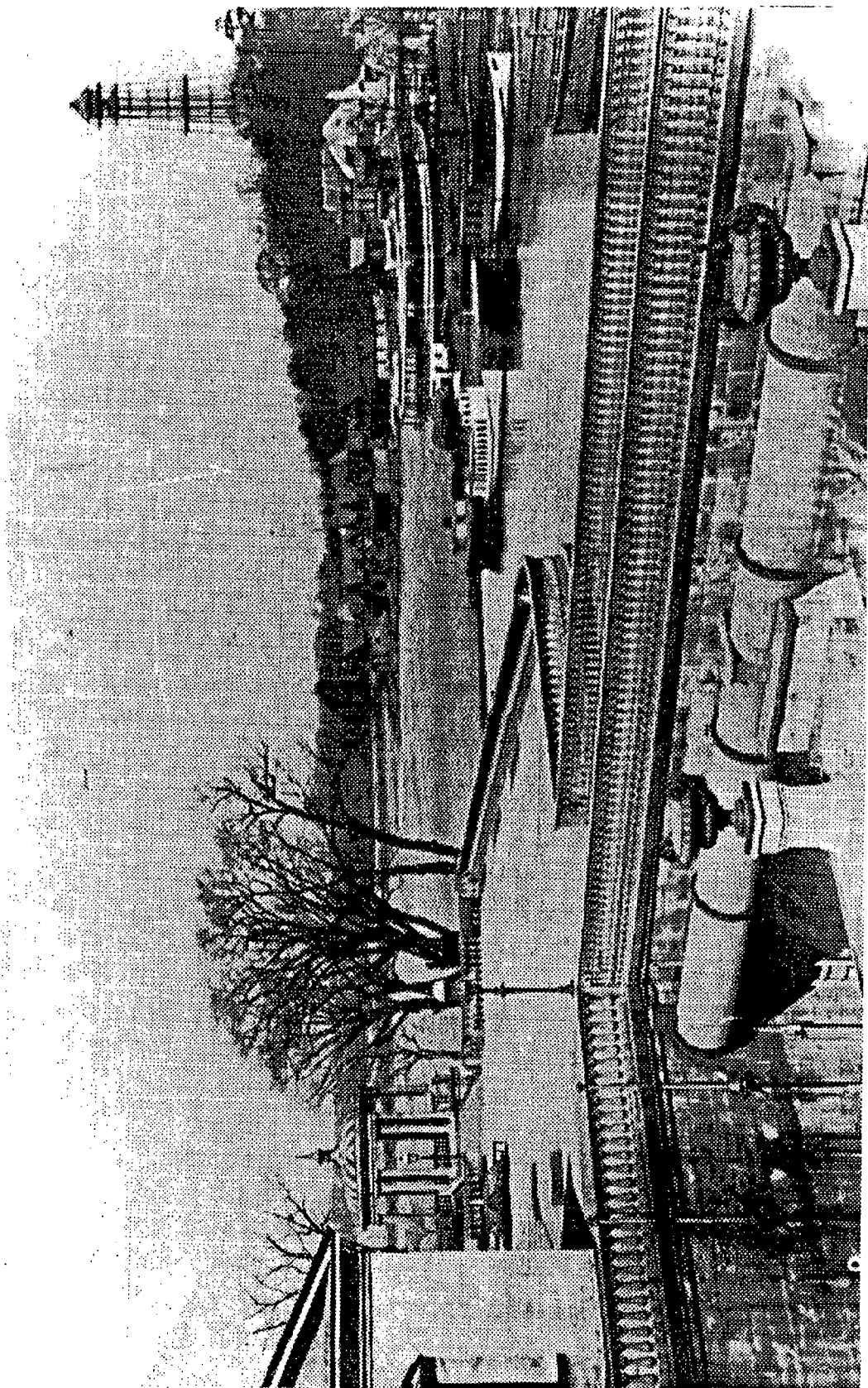
THE RACE BRIDGE FAIR MOUNT WATER WORKS, PHILADELPHIA.



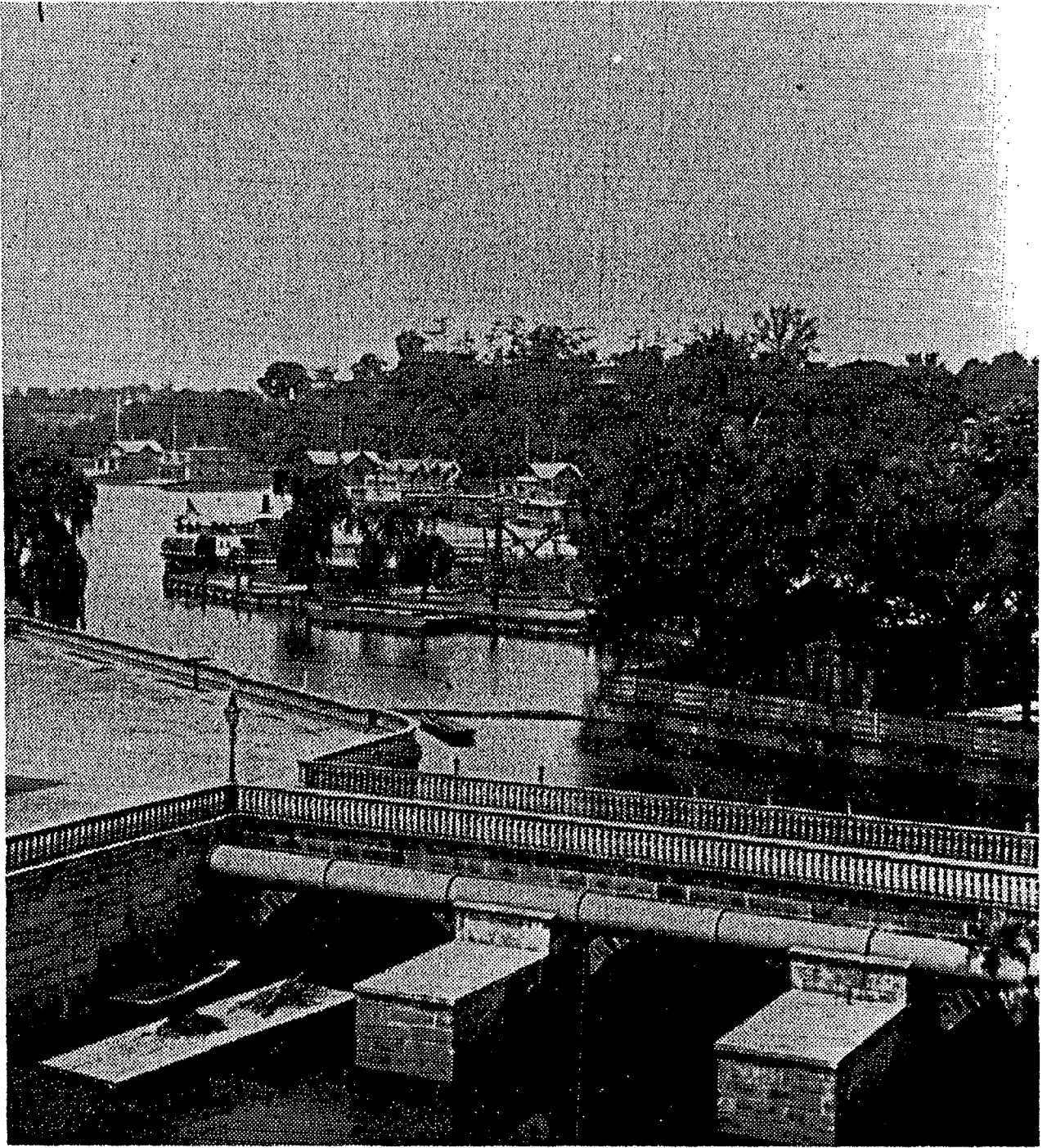


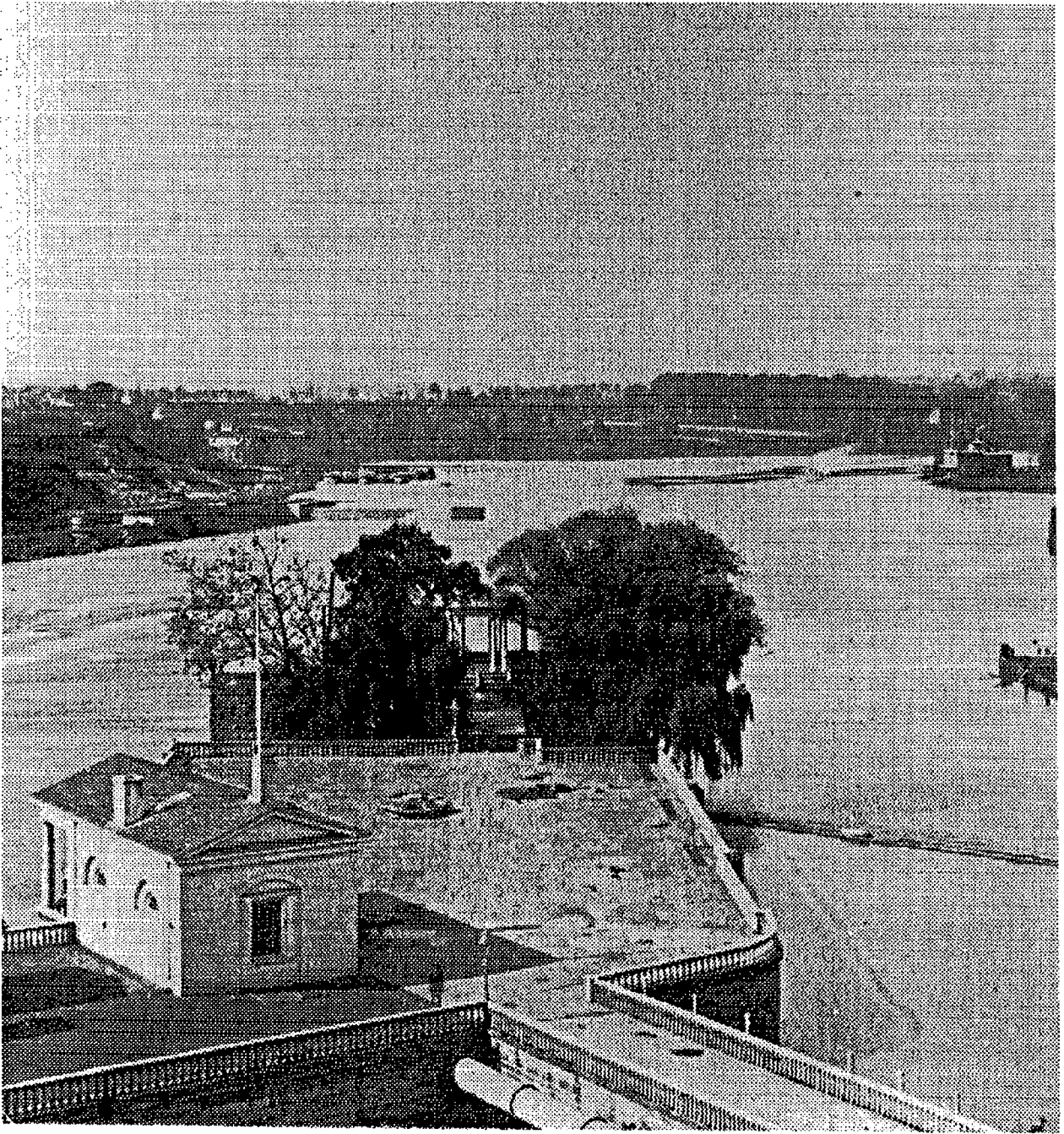


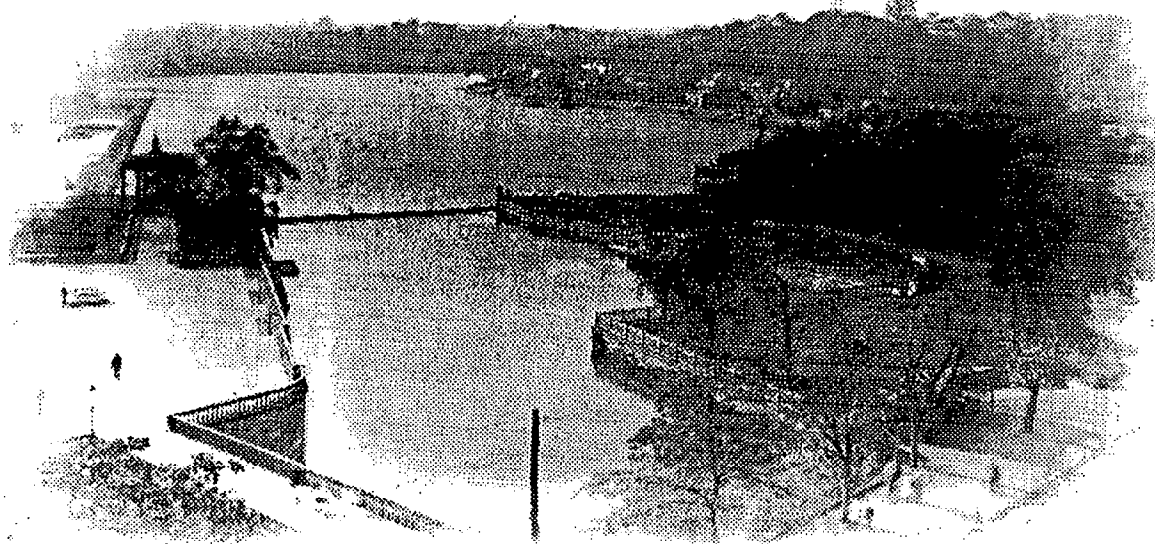




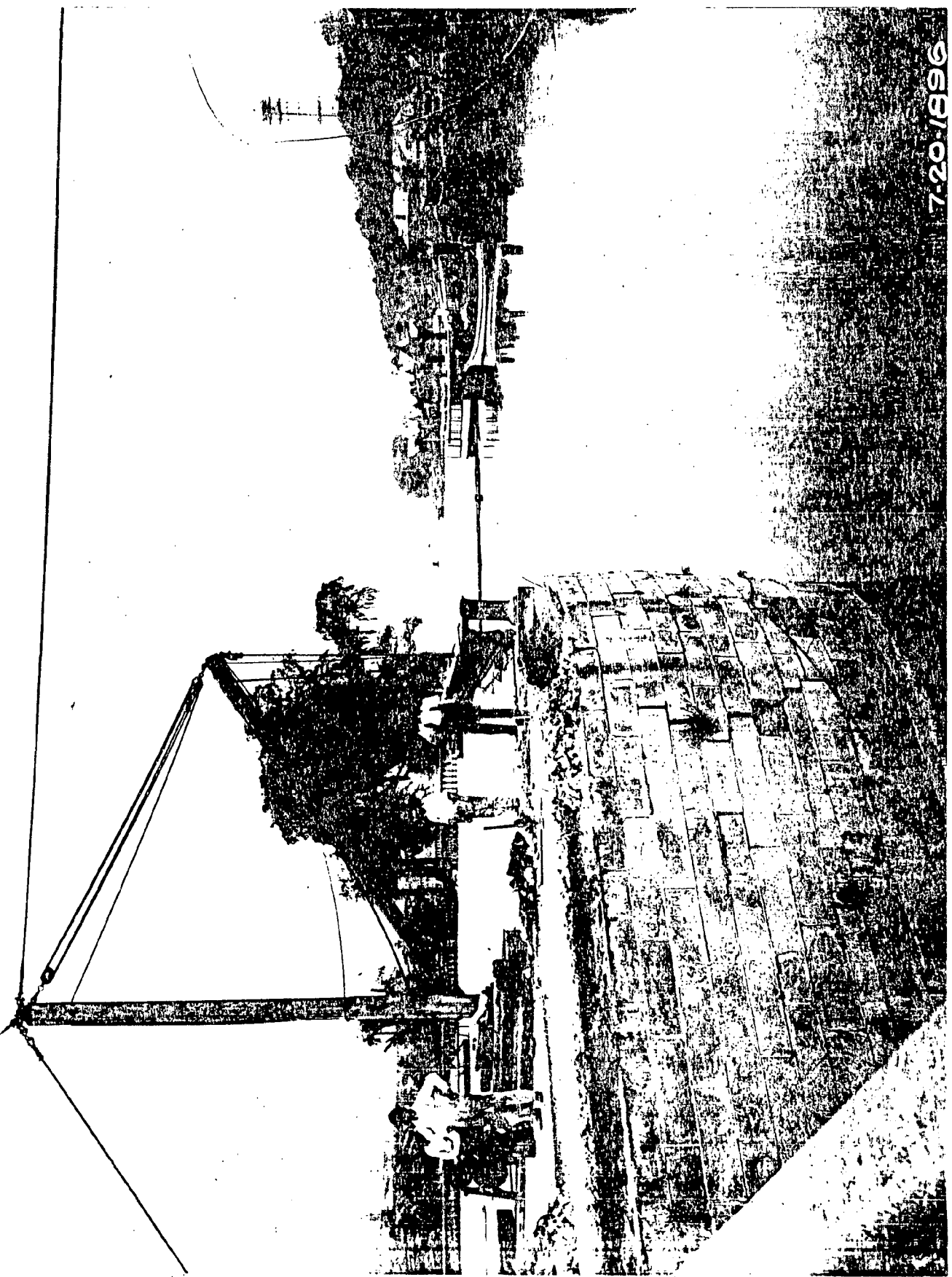








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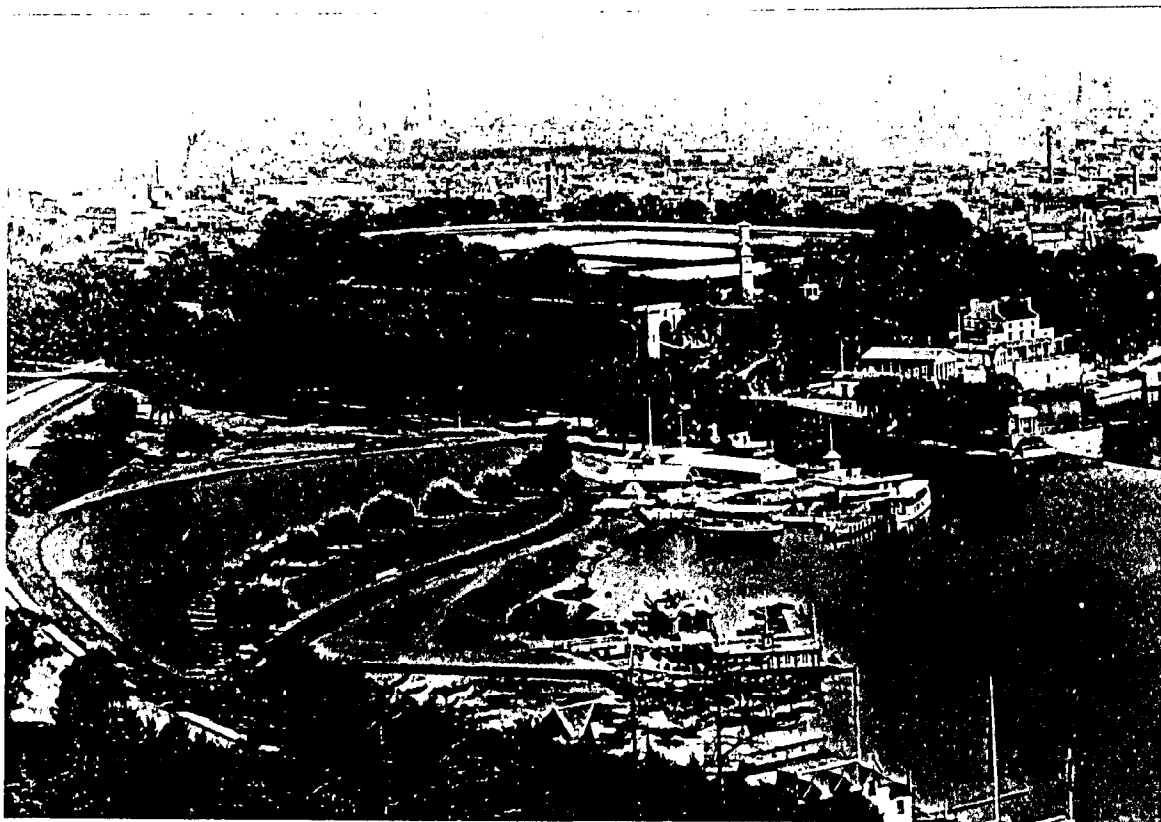


*Scenery in Fairmount Park.*

## **HISTORIC VIEWS: FOREBAY AND BRIDGE**

8. **DOCUMENTATION FOR BRIDGE AND RAILINGS BEFORE 1831**  
PHOTO COURTESY GEORGE ROSS VII.
9. **DOCUMENTATION OF EARLY CONDUITS OF FOREBAY**  
FAIRMOUNT FROM THE HEADARCHES OF THE FOREBAY,  
(PHILADELPHIA: C.G. CHILDS AND R.H. HOBSON, 1829), CITY ARCHIVES  
COLLECTION.
10. **DOCUMENTATION OF FOREBAY PRE 1867**  
VIEW OF FAIRMOUNT WATERWORKS FROM THE LANDING, 1867,  
JULIUS BIEN (AMERICAN, BORN GERMANY 1826-1909), ARTIST, AFTER  
JACOB KIEHN (ACTIVE PHILA., 1865-69).
11. **IRON RAILINGS AND FOREBAY, AT PERIOD OF RESTORATION**  
FAIRMOUNT WATERWORKS FOREBAY AREA: VIEW TAKEN FROM  
GARDEN PATHS LEADING TO RESERVOIR, 1870, CITY ARCHIVES  
COLLECTION.
12. **FOREBAY AND BOAT LANDING, CONNECTION TO OTHER RESOURCES**  
FAIRMOUNT WATERWORKS, c. JULY 1896, CITY ARCHIVES COLLECTION.
13. **FOREBAY LANDING NORTHWEST, 1896**  
FAIRMOUNT WATERWORKS: VIEW OF FOREBAY BRIDGE AND SMALL  
PAVILION, c. 1890 COLLECTION OF FAIRMOUNT PARK COMMISSION.
14. **DOCUMENTATION FOR PERIOD OF RESTORATION**  
FAIRMOUNT WATERWORKS: VIEW OF SOUTH ENTRANCE HOUSE AND  
PAVILION, PHOTO BY JAMES CREMER, c. 1870, COLLECTION OF  
FAIRMOUNT PARK COMMISSION.
15. **DOCUMENTATION FOR PERIOD OF RESTORATION**  
FAIRMOUNT WATERWORKS: FOREBAY BRIDGE, c. 1870, COLLECTION  
OF FAIRMOUNT PARK COMMISSION.

16. **DOCUMENTATION FOR PERIOD OF RESTORATION**  
FAIRMOUNT WATERWORKS: VIEW OF FOREBAY, WATERING  
COMMITTEE BUILDING AND NEW MILL HOUSE, LOOKING NORTHEAST,  
PHOTO BY JAMES CREMER, c. 1870, COLLECTION OF FAIRMONT PARK  
COMMISSION.
17. **DOCUMENTATION FOR PERIOD OF RESTORATION**  
FAIRMOUNT WATERWORKS FOREBAY, c. 1900, CITY ARCHIVES  
COLLECTION.
18. **DOCUMENTATION OF RETAINING WALL**  
REPAIRING FOREBAY WALL AT NEW MILL HOUSE, PHILADELPHIA WATER  
DEPARTMENT, 20 JULY 1896.
19. **DOCUMENTATION FOR PERIOD OF RESTORATION**  
VIEW OF FAIRMOUNT WATER WORKS FROM A STEREOPTICON JAMES CREMER, c. 1870,  
COLLECTION OF FAIRMOUNT PARK COMMISSION.

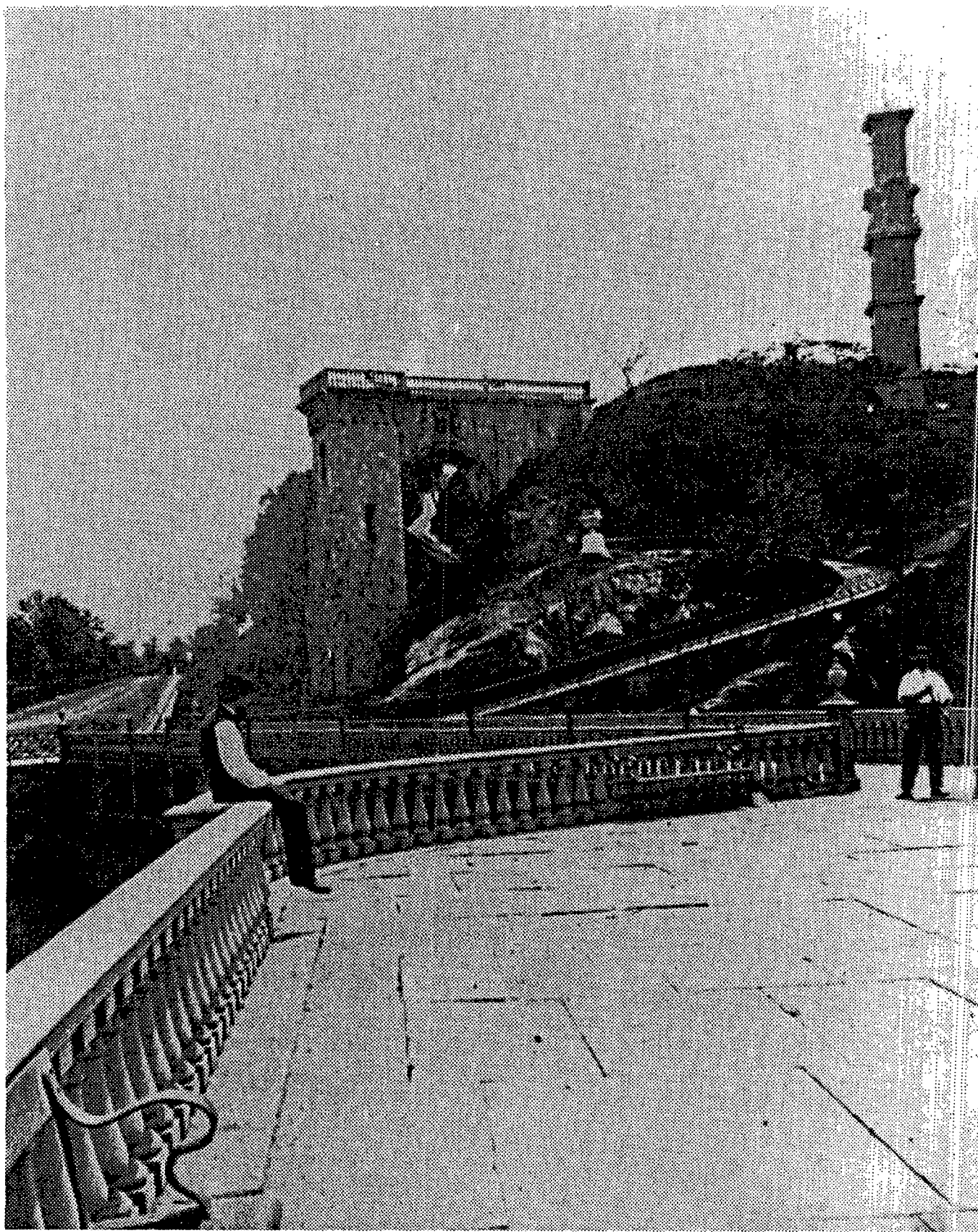


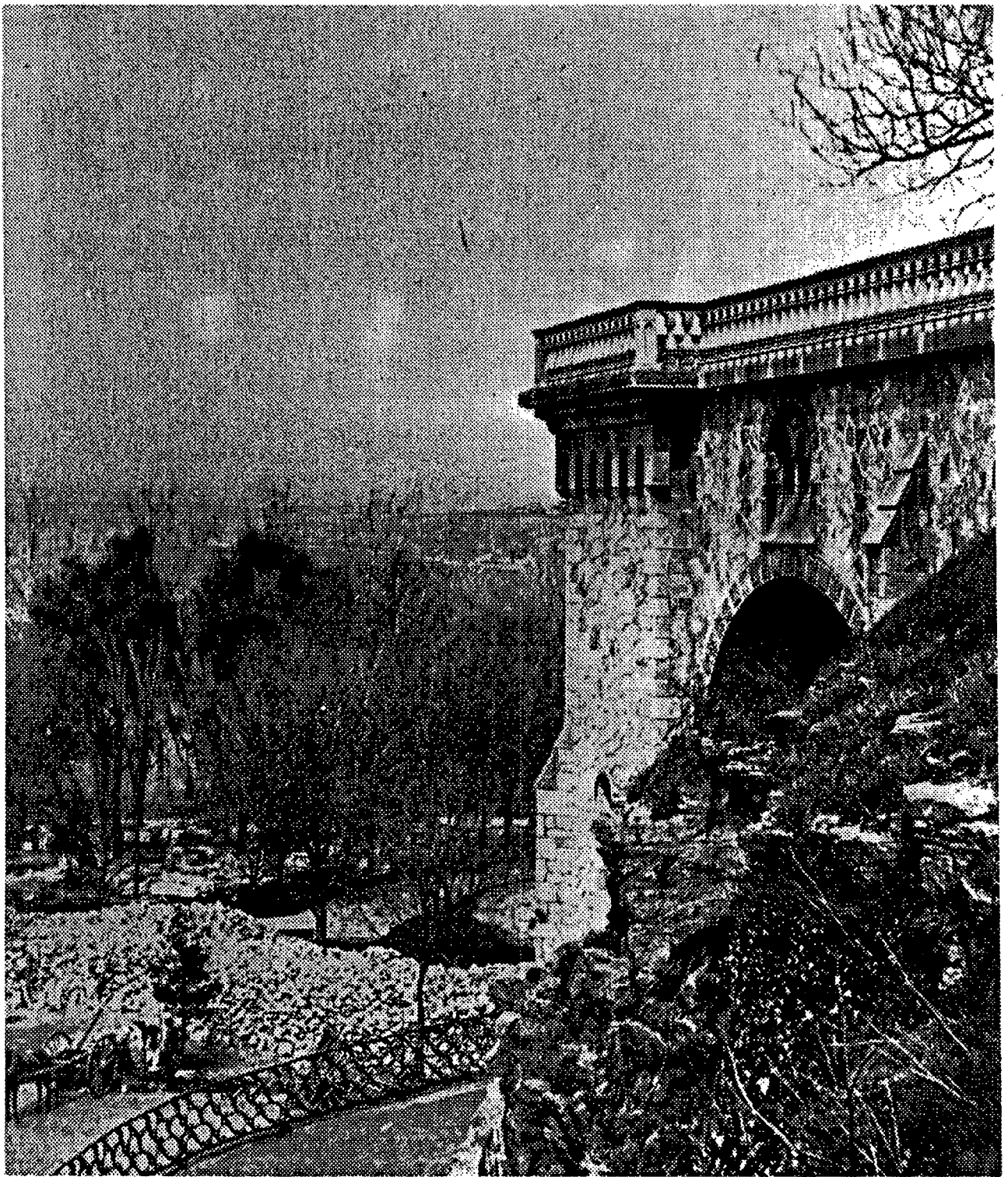
THE EVENING BULLETIN-PHILADELPHIA,  
PANORAMIC VIEW FROM FAIRMOUNT DAM OF THE LOWER SCHUYLKILL AQUEDUCT





22

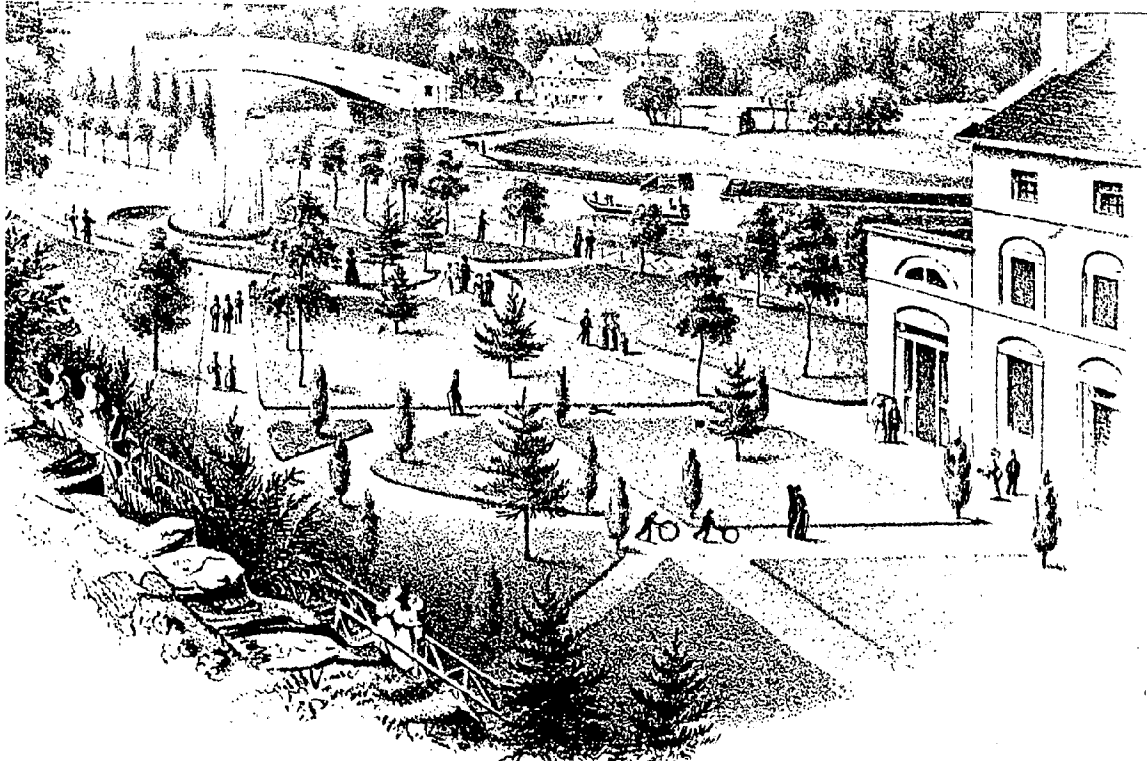




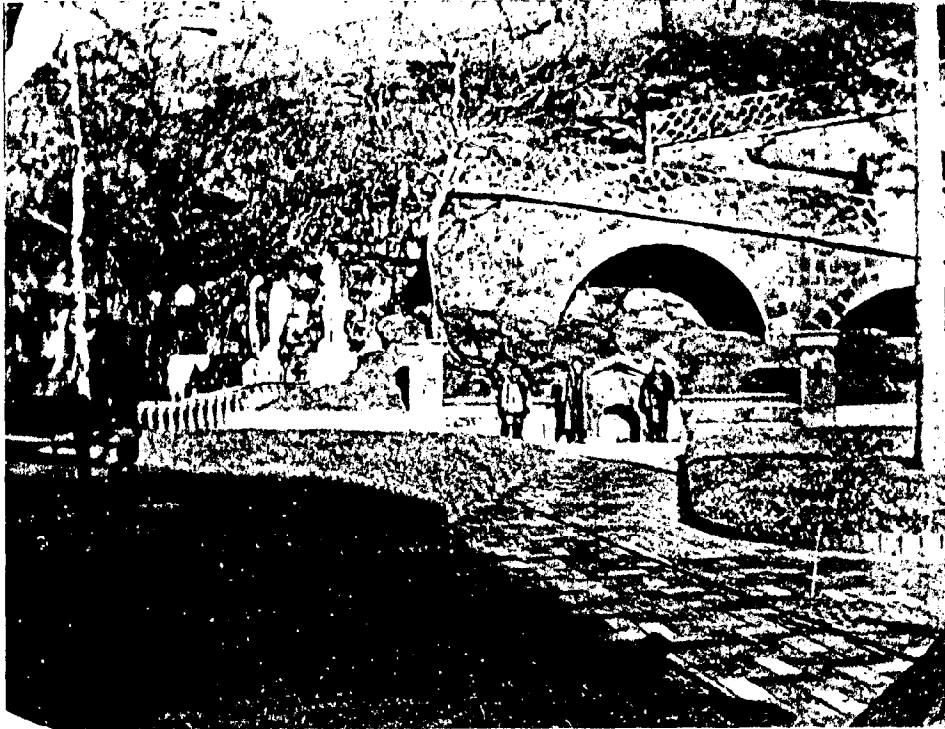


## **HISTORIC VIEWS: CLIFFSIDE PATHS AND STRUCTURES**

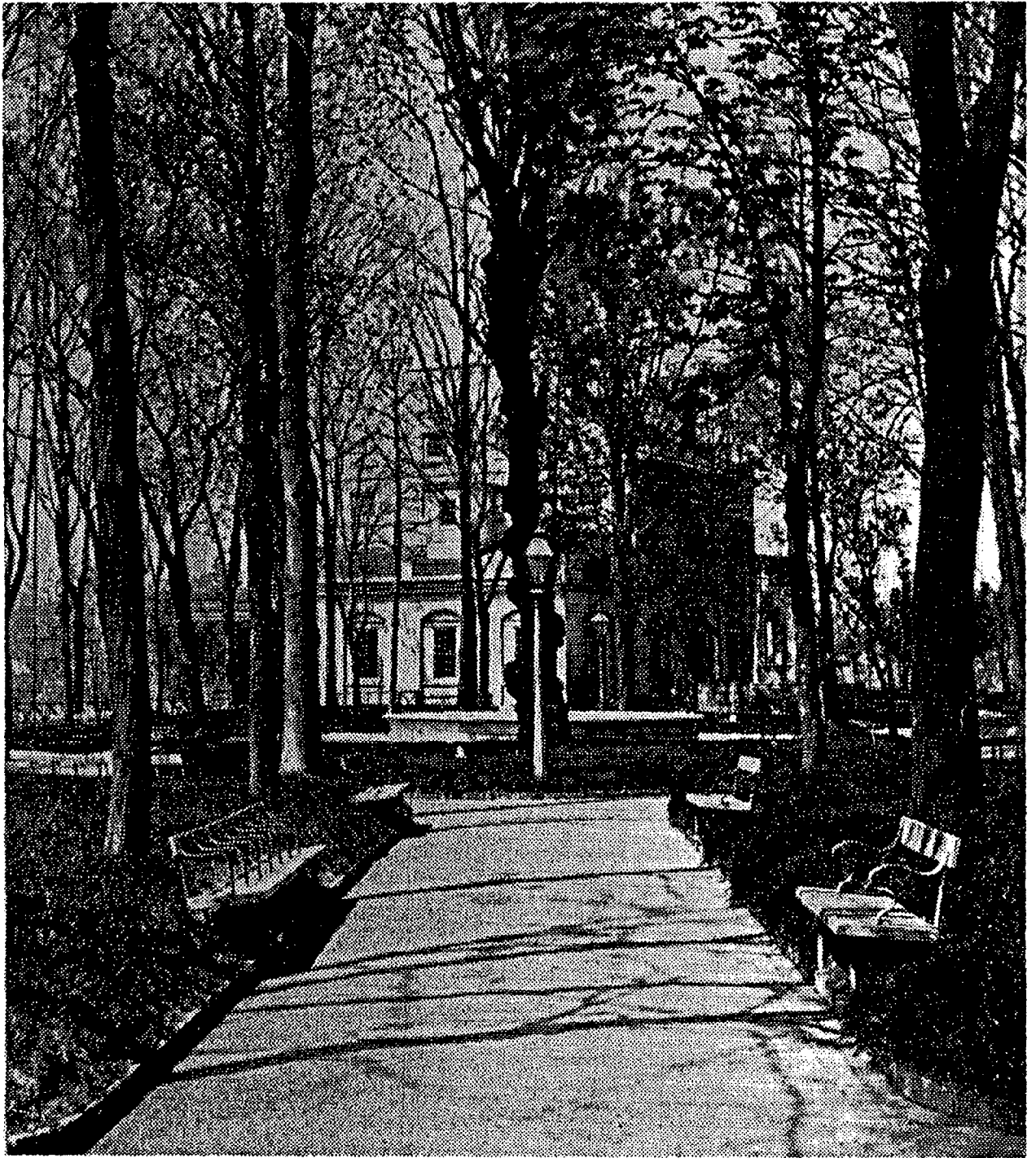
20. **DOCUMENTATION FOR LANDSCAPING AND WALKWAY CONNECTION TO OTHER RECREATIONAL RESOURCES**  
FAIRMOUNT WATERWORKS: VIEW FROM CENTENNIAL OBSERVATION TOWER LOOKING SOUTH, PHOTO BY JAMES CREMER, c. 1900, COLLECTION OF THE FREE LIBRARY OF PHILADELPHIA.
21. **DOCUMENTATION OF CONSTRUCTION OF AQUARIUM DRIVE**  
EVENING BULLETIN, 15 JUNE 1925, COLLECTION OF THE FREE LIBRARY OF PHILADELPHIA.
22. **DOCUMENTATION OF PATHWAYS FROM RESERVOIR SHOWS PAVING BELOW HILLSIDE AT EDGE OF FOREBAY**  
FAIRMOUNT WATERWORKS RESERVOIR, c. 1900, COURTESY OF THE FREE LIBRARY OF PHILADELPHIA.
23. **FOREBAY PAVING AND HILLSIDE, PERIOD OF RESTORATION**  
FAIRMOUNT WATERWORKS: VIEW OF RESERVOIR, DISTRIBUTION ARCH & STANDPIPE FROM TERRACE OF NEW MILL HOUSE, LANDING AVE. VISIBLE AT LEFT, PHOTO BY JAMES CREMER, c. 1870, COLLECTION OF FAIRMOUNT PARK COMMISSION.
24. **PATHS AND RAILINGS, PERIOD OF RESTORATION**  
FAIRMOUNT WATERWORKS: VIEW LOOKING NORTH FROM PATHS LEADING TO TOP OF RESERVOIR, PHOTO BY JAMES CREMER, c. 1870, COLLECTION OF FAIRMOUNT PARK COMMISSION.
25. **DOCUMENTATION FOR EQUIPMENT ON FOREBAY, PERIOD OF RESTORATION**  
FAIRMOUNT WATERWORKS DISTRIBUTION ARCH FROM PAVILION ABOVE OLD MILL HOUSE, PHOTO BY JAMES CREMER, c. 1870, COLLECTION OF FAIRMOUNT PARK COMMISSION.

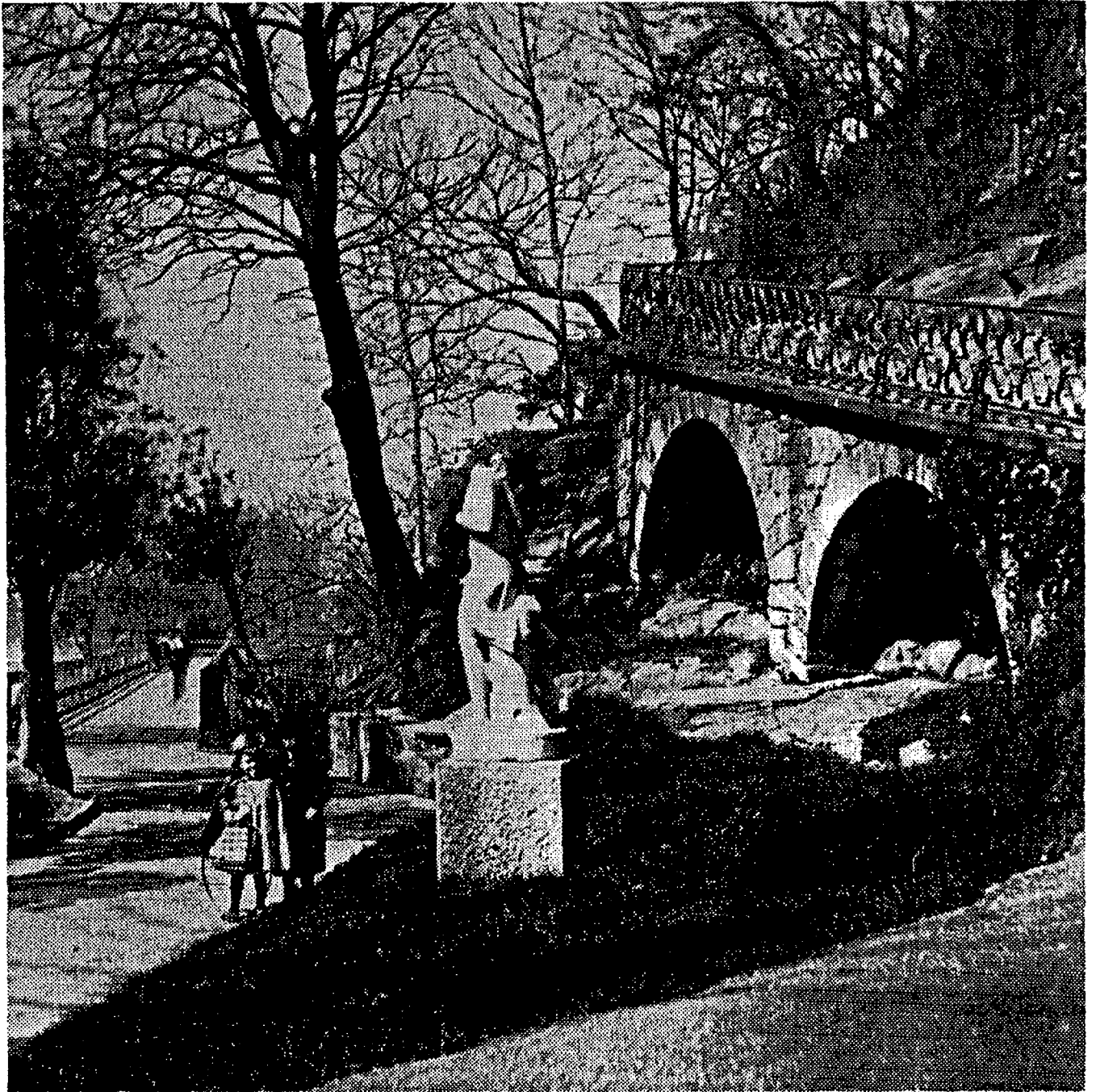


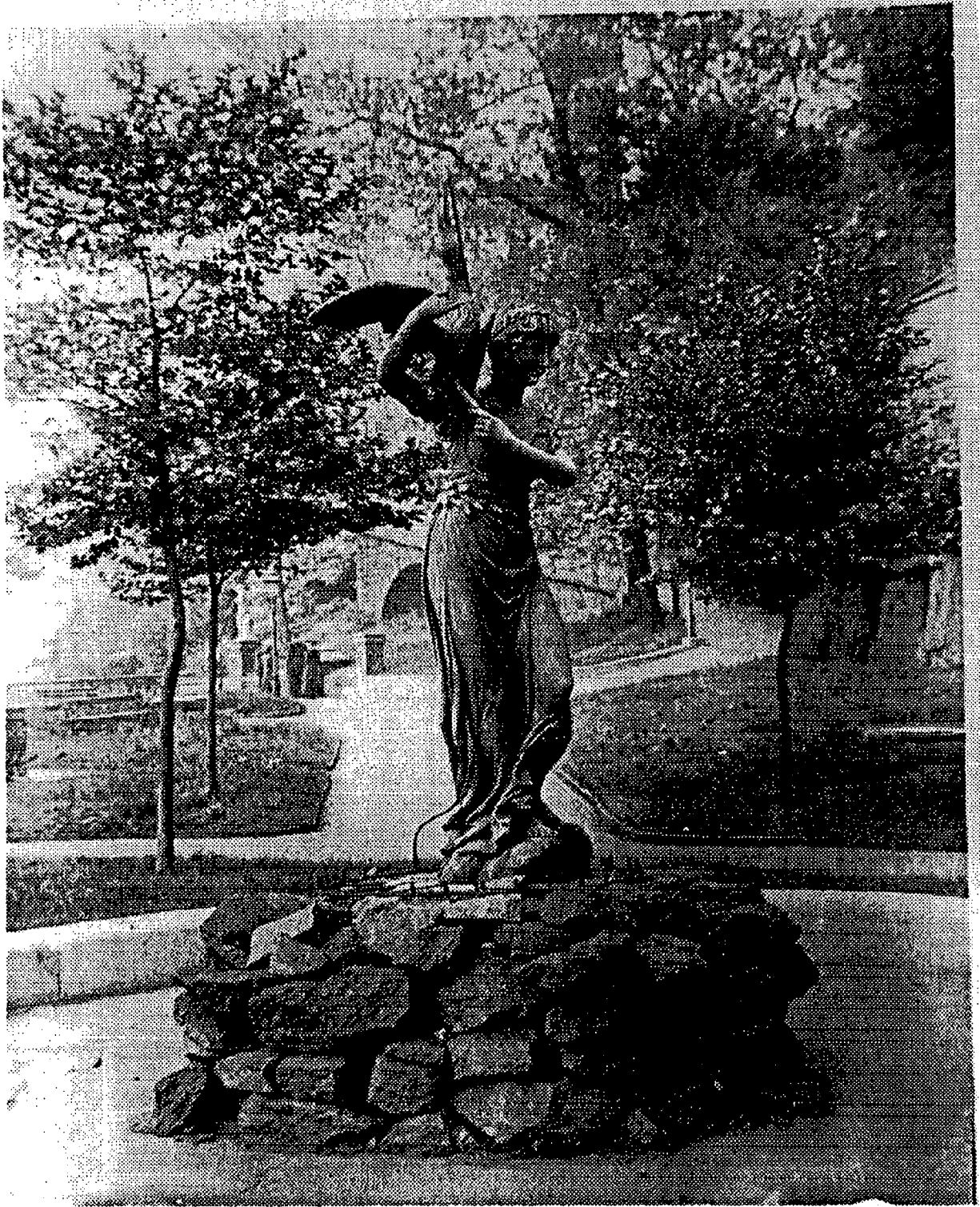
*Belmont's Building 177 Nassau St. N.Y.*

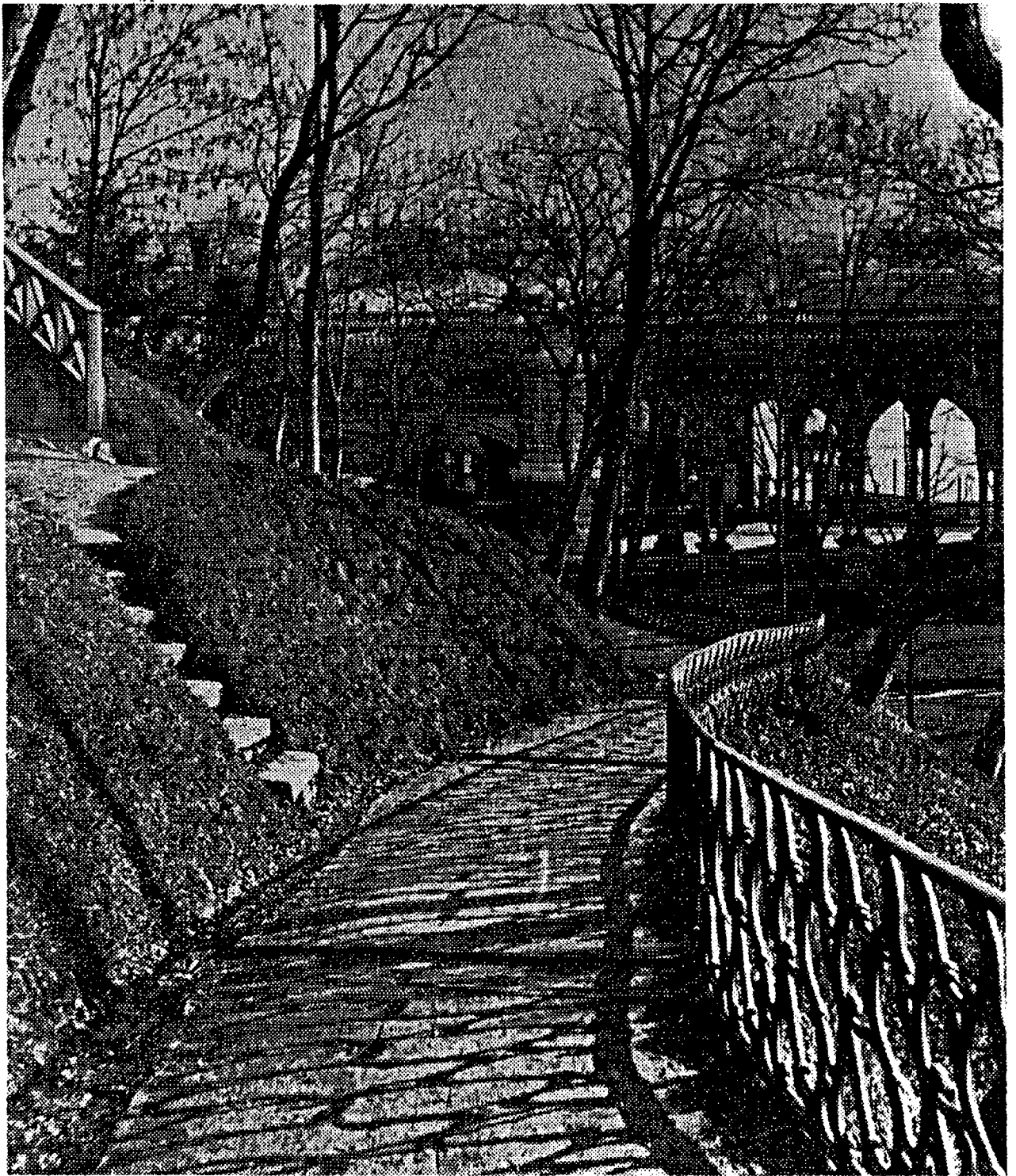


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## **HISTORIC VIEWS: SOUTH GARDEN**

26. **EARLY DEVELOPMENT OF SOUTH GARDEN AND TREE POSITIONS IN LAWN  
VIEW OF THE FAIRMOUNT WATERWORKS: FRONTISPIECE FROM "THE FAIRMOUNT  
QUADRILLES", c. 1830.**
27. **DOCUMENTATION FOR RETAINING WALL, LANDSCAPE, PAVING, AND BENCHES PERIOD OF  
RESTORATION  
VIEW FROM WEST BANK LOOKING EAST, c. 1870, COLLECTION OF THE FREE LIBRARY  
OF PHILADELPHIA.**
28. **DOCUMENTATION FOR LANDSCAPE, BENCHES, AND PAVING  
FAIRMOUNT WATERWORKS: ENGINE HOUSE & GARDEN, VIEW LOOKING  
NORTHWEST, c. 1870, COLLECTION OF FAIRMOUNT PARK COMMISSION.**
29. **DOCUMENTATION FOR LANDSCAPE, WALLS, AND RAILINGS PERIOD OF  
RESTORATION  
FAIRMOUNT WATERWORKS GARDEN NEAR FOREBAY, VIEW LOOKING NORTH, c. 1870,  
COLLECTION OF FAIRMOUNT PARK COMMISSION.**
30. **DOCUMENTATION OF LANDSCAPE, AND STATUARY PERIOD OF RESTORATION  
FAIRMOUNT WATERWORKS: SOUTH GARDEN NYMPH & BITTERN, c. 1895, EISENLOHR  
COLLECTION.**
31. **LANDSCAPE RAILINGS AND PAVING PERIOD OF RESTORATION  
FAIRMOUNT WATERWORKS: GARDEN AREA & PATH LEADING TO RESERVOIR, VIEW  
LOOKING SOUTH, c. 1870, PHOTO BY JAMES CREMER, COLLECTION OF FAIRMOUNT  
PARK COMMISSION.**

E. QUESTIONNAIRES COMPLETED  
BY PROJECT PARTICIPANTS

# THOMAS & NEWSWANGER • ARCHITECTS

3961 BALTIMORE AVENUE • PHILADELPHIA, PA 19104 • (215) 386-0200

MARIANNA M. THOMAS A.I.A.

BRIAN L. NEWSWANGER A.I.A.

November 27, 1989

Revised December 1, 1989

## FAIRMOUNT WATER WORKS FOREBAY FEASIBILITY STUDY

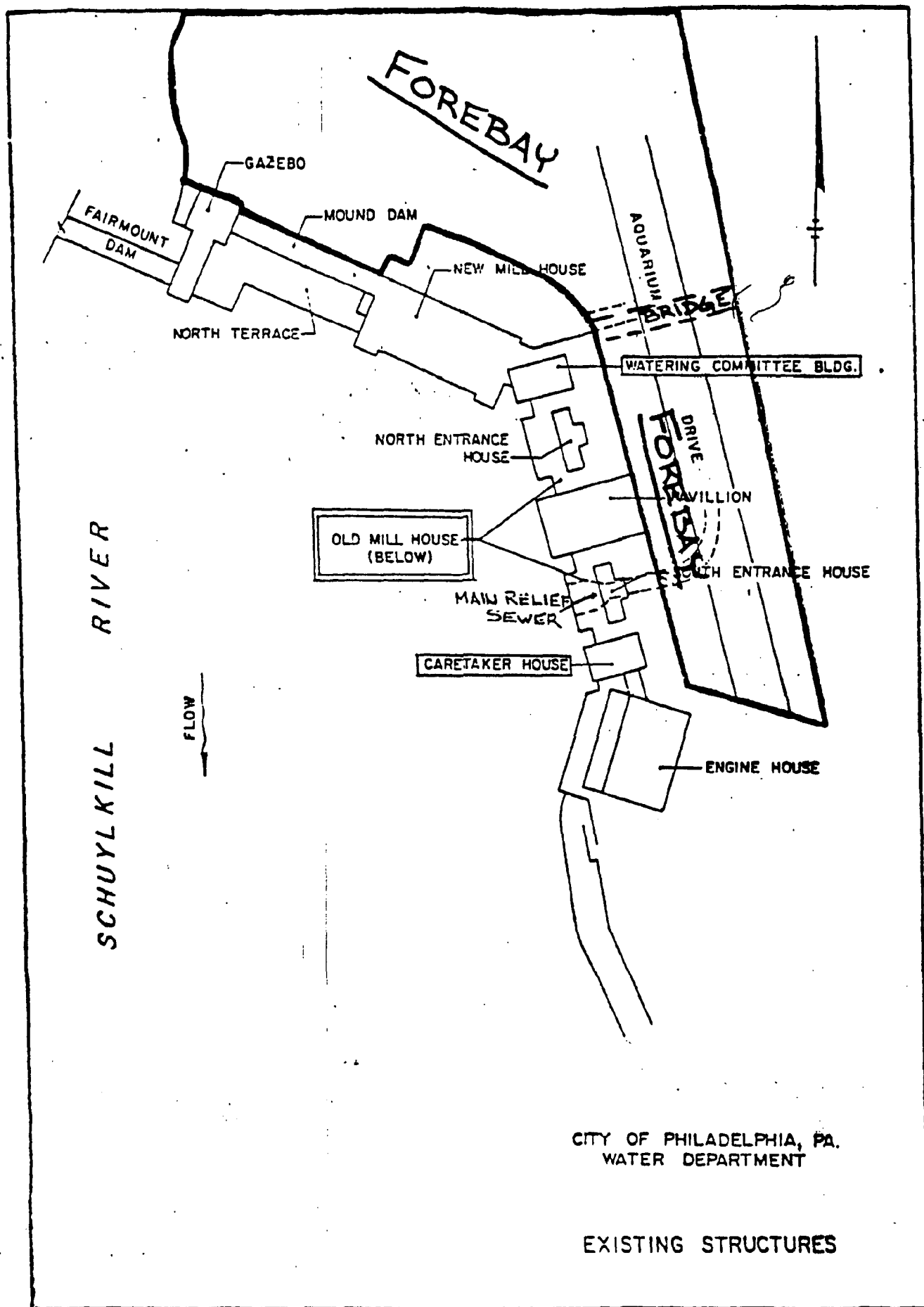
### Introduction

With the assistance of a grant from the Coastal Zone Management Division of the Pennsylvania Department of Environmental Resources, the Water Department has retained Thomas & Newswanger Architects to undertake a schematic design study for restoration of the Fairmount Water Works Forebay. Infilled in 1923 to provide the bed for Aquarium Drive, the Forebay was historically excavated as a race directing water from the Schuylkill River upstream of the dam, to the east side of the old mill house, through which it flowed to power the original waterwheels, and later turbines, before spilling back into the Schuylkill downstream of the dam. The Bridge provided access from the "mainland" across the Forebay to the Water Works promenades and facilities. The attached site plan illustrates the relationship between the original waterway and bridge and current street and park features.

A major objective of the schematic design study is the restoration of the relationship of land, water and buildings to evoke understanding of the original working system and to recreate the historic setting of one of Philadelphia's favorite sites. In the 19th century, visitors came to observe the success of simple technology in a setting which combined natural and man-made beauty. In a designed landscape whose backdrop is the rugged crags of Fair Mount rising above the water, the working structures were sunk beneath the Engine House Deck and the visitor's feet, crowned by a classically balanced row of doric pavilions along the riverfront.

In the 1990s, the restored Fairmount Waterworks will once again become a public attraction. Current plans call for operation of a restaurant in the Engine House and opening of interpretative displays below the Engine House Deck. In a context of increasing public visitation and need for service access, the restoration objectives of reintroducing water into the Forebay and reviving the Bridge approach to the site create challenges and present potential conflicts.

In the effort to take into account the work done by others before us and the opinions of those who have given time and thought over the last fifteen years to the restoration of the Water Works, we have prepared a short questionnaire. In the section on background and program information, feel free to focus on the portions with which you have experience and to skip unfamiliar items. But, please respond to all items in the section on views and opinions. Since the project has a short schedule, we must ask that all responses be sent to the above address by December 15, 1989.



## FAIRMOUNT WATER WORKS FOREBAY SCHEMATIC STUDY QUESTIONNAIRE

### I. BACKGROUND AND PROJECT PROGRAM

A. Describe your affiliation, role and previous experience in planning, fundraising, coordination, implementation of the restoration of the Fairmount Water Works.

Philadelphia Water Department, Manager, Public Education, with responsibility for development of the Water Works Interpretive Center, 1985-1989; served as liaison for Interpretive Center with all other facets of the Water Works installation, 1985-1988.

B. Documentary resources. The Water Department has provided copies of drawings, photographs and reports in its files, including 1978 HAER measured drawings; 1928 and 1984 sewer and utility drawings; 1981 Adaptive Use Feasibility Study of John Milner Associates; 1986 Design for an Interpretive Center by Matheu Cebul & Associates; historic photographs in Water Department files. From Fairmount Park files, prints of historic 1913 and 1923 site plans and the photogrammetric map have been assembled. Team researchers from Clio Group, Inc. expect to review the records of the historic libraries and archives in the city. If you are aware of other historic descriptions and/or views, historic site or garden plans, street or landscape drawings, or other sources, please list them below.

Not aware of other sources.

*P.S. Be sure to see*

*Cruff drawing (elevation) of the bridge,  
showing all dimensions (approx. 20' height of arch, e.g.),  
either at Franklin Institute or Phila. Museum of Art.*

C. Of what proposed future plans should we be aware for traffic, street, utility, pedestrian uses adjacent to the site, including Kelly Drive, Spring Garden Street bridge, West River Drive bridge, Philadelphia Art Museum driveway?

*Proposed*

Schulkill River Park connects with the South end of the Water Works Garden.

Does Fairmount Park or Boat House Row plan to remove the island which has formed from deposition just upstream of the Fairmount Dam?

## II. VIEWS AND OPINIONS

A. What do you see as the primary objectives for the site? (tourist attraction, historic restoration, recreation, cultural exhibit, income generation, occupancy of vacant buildings, other?)

In priority order:

- 1) Cultural icon - *restored*
- 2) Historic/environmental education
- 3) Recreation/tourist attraction

B. What do you see as the major restoration objectives for the site? What role should the Forebay serve at the site? (recreation, part of interpretive exhibit, park restoration, control of movement through site, other?)

The Forebay should serve an essential aesthetic and interpretive role at the site. Control of movement and access for restaurant and interpretive center should be accommodated around the aesthetic considerations. In addition, the Forebay can serve as a natural gathering place for outdoor events at the site.

C. In the best possible world, describe how you believe the Forebay, bridge, Aquarium Drive and other vehicular and pedestrian access would work in the restored site.

Exposure of the bridge and Forebay walls of the Old and New Mill Houses would add a vertical component to the northern and eastern facades of the sites, currently very horizontal. Bridge would be excavated enough to allow emergency vehicles under at least one arch. The east Forebay would serve as a natural gathering place for special events, concerts, etc. Inlet gates from Forebay to Old and New Mill Houses could be reopened for access and or light. At the east side of the Forebay, a slope or retaining wall with a roadway at its top would allow emergency and maintenance vehicle access to the Engine Houses and South Garden, replacing the current bite path. Utilities would be beneath this road way. A new staircase at the south end of the Forebay would permit access from the (SEE ATTACHED SHEET)

D. What constraints would make it difficult to achieve the restoration described in question II.C. above? (For example, your concerns about the reintroduction of water into the Forebay, restaurant delivery and trash disposal needs, etc.)

The Forebay would become a pond following every rainfall event, unless gravity flow to the river through the storm water conduit or a small storm water pumping station were constructed (PWD could maintain the pumping station) retaining wall might be necessary due to the width of the Forebay, but would add to the cost. Restaurant delivery and trash removal could be done through existing inlet gates or a new opening in the Forebay wall.

E. Explain advantages of the ideal you described in II.C above.

Meets all of my primary objectives for the site and accommodates restaurant and emergency vehicle access requirements.

F. Explain disadvantages of the ideal you described in II.C above.

Storm water run-off considerations.

G. Do you think that limiting vehicular access to the Forebay and Aquarium Drive would enhance the site's historic character? absolutely  
...would detract from its use by the public? on the contrary  
Explain your thinking.

The aesthetic and interpretive objectives can be maximized by limiting vehicular access to the Forebay. Valet parking for the restaurant at night would limit its use for evening special events, but would not have an unreasonable impact on my objectives. The impact of restaurant delivery and trash disposal could be minimized through the design process.

II. C. (Cont'd)

Forebay to the South Garden level. Parking would be prohibited in the Forebay or along the elevated access road. Valet parking might be accommodated, however. I envision something akin to the dry moats of restored European castles. The floor of the Forebay could be terrace in some fashion to hide the storm water sewer and accommodate multiple uses. Excavation of the Forebay would continue west towards the gazebo at the end of the Mound Dam, perhaps inclining from the bridge to the existing elevation at the river's edge and the Italian fountain circle.

vers 2

FAIRMOUNT WATER WORKS FOREBAY SCHEMATIC STUDY QUESTIONNAIRE

I. BACKGROUND AND PROJECT PROGRAM

A. Describe your affiliation, role and previous experience in planning, fundraising, coordination, implementation of the restoration of the Fairmount Water Works.

Matthew G. Smith, Project Engineer, Philadelphia Water Department

1986 thru 1987 - PWD representative for the Old Mill House Restoration and Storm Sewer Reconstruction; Member of Fairmount Water Works Steering Committee.

B. Documentary resources. The Water Department has provided copies of drawings, photographs and reports in its files, including 1978 HAER measured drawings; 1928 and 1984 sewer and utility drawings; 1981 Adaptive Use Feasibility Study of John Milner Associates; 1986 Design for an Interpretive Center by Matheu Cebul & Associates; historic photographs in Water Department files. From Fairmount Park files, prints of historic 1913 and 1923 site plans and the photogrammetric map have been assembled. Team researchers from Clio Group, Inc. expect to review the records of the historic libraries and archives in the city. If you are aware of other historic descriptions and/or views, historic site or garden plans, street or landscape drawings, or other sources, please list them below.

XX

C. Of what proposed future plans should we be aware for traffic, street, utility, pedestrian uses adjacent to the site, including Kelly Drive, Spring Garden Street bridge, West River Drive bridge, Philadelphia Art Museum driveway?

XX

FAIRMOUNT WATER WORKS FOREBAY SCHEMATIC STUDY QUESTIONNAIRE CON'T

I. BACKGROUND AND PROJECT PROGRAM

A. CON'T

1988 to present Prepared Engine House Deck Reconstruction construction specifications; responsible for public advertisement of the EHD project and contractor selection; attend monthly on-site construction progress meetings for EHD and responsible for PWD coordination with outside agencies; Review consultants invoices; PWD representative in charge of DCZM grant for the Forebay Feasibility Study; Member of Fairmount Water Works Steering Committee.

## II. VIEWS AND OPINIONS

A. What do you see as the primary objectives for the site? (tourist attraction, historic restoration, recreation, cultural exhibit, income generation, occupancy of vacant buildings, other?)

The primary objective in my mind is to create a safe environment in which the public/tourist can come and see the Fairmount Water Works as it once was. From my experience with historic restoration many people are very interested in the FWW's site and how it worked as the City's water supply. One major problem is the lack of people in the area causing safety concerns. With the future development of a restaurant at the site for nighttime use, this problem of safety will be alleviated due to the public presence. Of particiualr concern is the South Garden area near the Spring Garden Street Bridge and the cliffs along the present Aquarium Drive are hiding places for the "undesirable element".

B. What do you see as the major restoration objectives for the site? What role should the Forebay serve at the site? (recreation, part of interpretive exhibit, park restoration, control of movement through site, other?)

The primary role of an excavated Forebay and Forebay bridge at the FWW's would be to show how the Mill Buildings served as an extension of the Fairmount Dam. This is key in interpreting the facility and understanding how it operated.

C. In the best possible world, describe how you believe the Forebay, bridge, Aquarium Drive and other vehicular and pedestrian access would work in the restored site.

My idea of an excavated Forebay would be the exposure of the Forebay Bridge including its arches for pedestrian access across the top of the bridge to the Old Mill House Deck from the Art Museum hillside. Emergency and valet parking access to the Engine House from the Italian Fountain circle area could be over the Forebay Bridge by means of an earthen ramp up to and down from the eastern most arch of the bridge which allows pedesetrian passage beneath the two arches closest to the Old Mill House. The Forebay wall of the Old Mill House would have the existing gates opened as passageways for pedestrians/patrons into the area beneath the Old Mill House Deck. Restaurant service vehicles would ideally come from the South Garden underneath the Spring Garden St. Bridge.

D. What constraints would make it difficult to acheive the restoration described in question II.C. above? (For example, your concerns about the reintroduction of water into the Forebay, restaurant delivery and trash disposal needs, etc.)

My biggest concern is the cost of constructing a roadway for restaurant service vehicles to enter from the south.

E. Explain advantages of the ideal you described in II.C above.

The advantage is limited vehicular access during daytime and controlled valet parking for the restaurant in the evening. This allows safe usage of the excavated Forebay by pedestrians/patrons. Access from the south for restaurant service vehicles would help deter the "undesirables" in the South Garden area.

F. Explain disadvantages of the ideal you described in II.C above.

Once again, the cost of constructing an access road from the south is a concern.

G. Do you think that limiting vehicular access to the Forebay and Aquarium Drive would enhance the site's historic character? \_\_\_\_\_  
...would detract from its use by the public? \_\_\_\_\_  
Explain your thinking.

I think that limiting vehicular access to the Forebay/Aquarium Drive would enhance the site's historic character. The vision of strolling through the historic Fairmount Water Works would be pleasing to me as a citizen. Excessive vehicular traffic would more than likely detract from this passive recreation.

## FAIRMOUNT WATER WORKS FOREBAY SCHEMATIC STUDY QUESTIONNAIRE

### I. BACKGROUND AND PROJECT PROGRAM

A. Describe your affiliation, role and previous experience in planning, fundraising, coordination, implementation of the restoration of the Fairmount Water Works.

Ed Grusheski, Water Works Interpretive Center Director

- . Hired by Philadelphia Water Department to organize an interpretive center in a portion of the restored Fairmount Water Works.
- . Background: Museum curator and educator.
- . Have been working on the project since November of 1988.

B. Documentary resources. The Water Department has provided copies of drawings, photographs and reports in its files, including 1978 HAER measured drawings; 1928 and 1984 sewer and utility drawings; 1981 Adaptive Use Feasibility Study of John Milner Associates; 1986 Design for an Interpretive Center by Matheu Cebul & Associates; historic photographs in Water Department files. From Fairmount Park files, prints of historic 1913 and 1923 site plans and the photogrammetric map have been assembled. Team researchers from Clio Group, Inc. expect to review the records of the historic libraries and archives in the city. If you are aware of other historic descriptions and/or views, historic site or garden plans, street or landscape drawings, or other sources, please list them below.

In addition to materials provided above, the Water Department has compiled a list of Water Works materials in the Library Company of Philadelphia (some Xerox copies of visual materials in that institution's holdings, as well).

C. Of what proposed future plans should we be aware for traffic, street, utility, pedestrian uses adjacent to the site, including Kelly Drive, Spring Garden Street bridge, West River Drive bridge, Philadelphia Art Museum driveway?

The Fairmount Park Commission has recently undertaken a study of public use and vehicular traffic patterns in the area of the Park immediately north of the site.

## **II. VIEWS AND OPINIONS**

**A. What do you see as the primary objectives for the site? (tourist attraction, historic restoration, recreation, cultural exhibit, income generation, occupancy of vacant buildings, other?)**

1. Restoration of a Nat'l Historic Landmark to ca. 1871 appearance.
2. Interpretation of central role Water Works played in development of 19th C Philadelphia - a public educational facility at the site.
3. Appropriate commercial reuse of buildings which will attract the public ensuring the Water Works a role in Philadelphia's urban life today.

**B. What do you see as the major restoration objectives for the site? What role should the Forebay serve at the site? (recreation, part of interpretive exhibit, park restoration, control of movement through site, other?)**

To make the Fairmount Water Works once again a destination - recreational and cultural - for Philadelphians. A restored forebay would make the mechanics of the Water Works immediately understandable to the visitor; it would also provide the opportunity to restore the truly unique garden setting that once existed there.

**C. In the best possible world, describe how you believe the Forebay, bridge, Aquarium Drive and other vehicular and pedestrian access would work in the restored site.**

Ideally, I would like to see a fully restored Forebay with the excavated bridge providing only pedestrian access at the north end of the site; the dark stone of Fairmount punctuated by fountains, sculpture, and a romantic footpath to the Art Museum would drop, once again, directly into the waters of the Forebay. Those same waters would flow through the building operating the remaining turbine and pump.

**D. What constraints would make it difficult to achieve the restoration described in question II.C. above? (For example, your concerns about the reintroduction of water into the Forebay, restaurant delivery and trash disposal needs, etc.)**

Admittedly this vision would severely limit vehicular access to the site, a less than desirable situation for a restaurant or an Interpretive Center. However, full excavation of the bridge and the Forebay adjacent to the Old Mill House without reintroducing water would add significantly to interpreting the site, while allowing limited vehicular access for the restaurant and Interpretive Center. A full excavation would also provide a new area for adaptive use, a degree of security for the ensemble of buildings, and an opportunity to connect areas on either of that space which, it appears, will be occupied by a restaurant, thereby enhancing the physical situation for an Interpretive Center.

E. Explain advantages of the ideal you described in II.C above.

See above.

F. Explain disadvantages of the ideal you described in II.C above.

See above.

G. Do you think that limiting vehicular access to the Forebay and Aquarium Drive would enhance the site's historic character? Absolutely yes  
...would detract from its use by the public? No  
Explain your thinking.

Historically access to the north end of the site was by foot only, carriages could approach through the south garden while access for operational needs was generally accomplished by river (the latter two means of access might be looked at as possible solutions for today). The Fairmount Water Works was a major visitor destination where on foot, one could leisurely admire the well-maintained gardens, the bucolic views, and the impressive machinery housed discretely in an ensemble of handsomely designed buildings and enjoy a bite to eat at the Engine House Restaurant. With an imaginative plan which would allow limited vehicular access through a fully excavated Forebay, the Fairmount Water Works could become such a destination once again, a genuine asset to the Fairmount Park System.

## FAIRMOUNT WATER WORKS FOREBAY SCHEMATIC STUDY QUESTIONNAIRE

### I. BACKGROUND AND PROJECT PROGRAM

A. Describe your affiliation, role and previous experience in planning, fundraising, coordination, implementation of the restoration of the Fairmount Water Works. *My position dealt with general research and actual preservation of a portion of the buildings at the site, namely the Watering Committee Bldg. and the Caretaker's Residence. I provided assistance to the various groups interested in preserving the site thru a variety of ways over the years.*

B. Documentary resources. The Water Department has provided copies of drawings, photographs and reports in its files, including 1978 HAER measured drawings; 1928 and 1984 sewer and utility drawings; 1981 Adaptive Use Feasibility Study of John Milner Associates; 1986 Design for an Interpretive Center by Matheu Cebul & Associates; historic photographs in Water Department files. From Fairmount Park files, prints of historic 1913 and 1923 site plans and the photogrammetric map have been assembled. Team researchers from Clio Group, Inc. expect to review the records of the historic libraries and archives in the city. If you are aware of other historic descriptions and/or views, historic site or garden plans, street or landscape drawings, or other sources, please list them below.

*Everyone involved with historic research on the site has made use of the material I have in my files. At this point it is difficult to determine what has not been used. The material is available for your use at any time.*

C. Of what proposed future plans should we be aware for traffic, street, utility, pedestrian uses adjacent to the site, including Kelly Drive, Spring Garden Street bridge, West River Drive bridge, Philadelphia Art Museum driveway?

*N/A*

## II. VIEWS AND OPINIONS

A. What do you see as the primary objectives for the site? (tourist attraction, historic restoration, recreation, cultural exhibit, income generation, occupancy of vacant buildings, other?) *I am drawn by professional and personal standards to work toward the preservation/restoration of the site in such a way as to provide the visitor a view of the entire site as it originally was. Naturally this may be an impossibility and probably is. How this is achieved will involve crucial compromises I am sure, but you have to start somewhere. The occupancy of vacant buildings is a mandatory first step.*

B. What do you see as the major restoration objectives for the site? What role should the Forebay serve at the site? (recreation, part of interpretive exhibit, park restoration, control of movement through site, other?)

*The exterior facade is most important. I perceive the Forebay as part of this facade and as such, should be restored as close as possible to its original condition.*

C. In the best possible world, describe how you believe the Forebay, bridge, Aquarium Drive and other vehicular and pedestrian access would work in the restored site.

*As I said in II A, the exterior conditions should support the general view of the site. All of the items you mention are involved in this.*

D. What constraints would make it difficult to achieve the restoration described in question II.C. above? (For example, your concerns about the reintroduction of water into the Forebay, restaurant delivery and trash disposal needs, etc.) *I hate to say this, but I think you were hired to come up with recommendations and solutions for the Forebay/bridge area based on constraints as created by the various adaptive reuses. I think we discussed much of this at your presentation. Obviously I lean toward a pure restoration. I really don't believe we can achieve this based on the current recommended uses. I am anxious to see what you come up with. I think the people that are involved with the adaptive reuses should best answer this question.*

E. Explain advantages of the ideal you described in II.C above.

F. Explain disadvantages of the ideal you described in II.C above.

G. Do you think that limiting vehicular access to the Forebay and Aquarium Drive would enhance the site's historic character? YES  
...would detract from its use by the public? \_\_\_\_\_  
Explain your thinking.

*But restaurant activities and a public museum will more than likely demand otherwise*

I.

- A. Joan Fredette has been associated with the Fairmount Water Works since 1980 as coordinator of special programs and facilities for the Fairmount Park Commission. Joan sat on the original steering committee chaired by former Water Commissioner Marrazzo. In 1983, as part of her charge as Manager of the Public Affairs division for the Water Department, she hired a Water Works Interpretive Center Coordinator who is heading fundraising and organizational development of the Interpretive Center at the Water Works. During Joan's tenure at Fairmount Park and Philadelphia Water Department, she has prepared fundraising packages for William Penn, Diedrich and PEW foundations, led the Italian fountain restoration, coordinated programming and overseen major goals and objectives for the Water Works.
- B. Ed Grusheski, who heads the Interpretive Center project for the Water Department, has access to all department reports, drawings, models with respect to the Water Works. He may be contacted at 592-4908.
- C. In addition to those mentioned, there are several ongoing projects in the vicinity of the Water Works that you should be aware of: The Pennsylvania Horticulture Society's restoration of the Azelea Gardens, the proposed pedestrian bridge or traffic light on Kelly Drive at Boat House Row, two Coastal Zone Management grants; to one for Boat House Row restoration and the other for docking facilities on the lower Schuylkill to encourage visitors to Bartrams Gardens, the Water Works, etc., state money appropriated for dredging between Boat House Row and Schuylkill River island, and a feasibility study for Schuylkill River Park.

II.

- A. The Water Department's main goal in restoring the Water Works is the education and the interpretation of the history of the Schuylkill River and the water system in Philadelphia.
- B. The Water Works site is extraordinary in that it sits on a peninsula. Recreating the impression of the forebay should be the major goal for both the esthetics and education reasons. Solutions to the vehicular and pedestrian traffic are complicated by the excavation of the forebay, but we are hopeful that you, the designer, will develop viable options that accentuates this incredible site.
- C. See above.
- D. The most difficult problem to solve if the forebay is dug will be the coexistence of history with the restaurant.

E. See 2B.

F. See 2B.

G. Yes  
No, not if it is done properly.

cc: Ed Grusheski  
John Plonski



## FAIRMOUNT PARK COMMISSION

MEMORIAL HALL

West Park, Philadelphia, Pa. 19131

December 12, 1989

RECEIVED

DEC 19 1989

IER

Marianna M. Thomas, A.I.A.  
Thomas & Newswanger Architects  
3961 Baltimore Avenue  
Philadelphia, PA 19104

re: Fairmount Waterworks  
Forebay Feasibility Study

Dear Marianna:

The Fairmount Park Commission has undertaken the restoration of Fairmount Waterworks with the assistance of the Philadelphia Water Department and the Junior League of Philadelphia. I coordinate this project with those organizations under the Park Director.

Our intention in excavating Aquarium Drive is to recreate the appearance of the forebay as an essential element of the restoration. Also necessary will be provision of access to the river level of the Old Mill House for service delivery and emergency egress.

The plans for access to the interpretive center and restaurant anticipate primary entrances via the existing stairway to the pumproom in the Engine House and via the Caretakers' House for the restaurant (plans enclosed). The drop off point should be within 200 feet of these doors.

I expect, in the completed work to be able to look across the excavated forebay from the Old Mill deck to the exposed rock face of Fair Mount. This will then recreate the mill buildings as a pier extending to the dam with access via the forebay bridge. The creation of the Waterworks as a place physically tied to the river and separate from the Park will establish it as a major destination. Please refer to my plan in the drawing in the enclosed brochure. In finished form, better exposure needs be given to the bridge structure.

Please call me at 685-0044, if I may be of further assistance in your design.

Sincerely,

Peter N. Odell  
Management & Development  
Administrator

FAIRMOUNT WATER WORKS FOREBAY SCHEMATIC STUDY QUESTIONNAIRE

I. BACKGROUND AND PROJECT PROGRAM

A. Describe your affiliation, role and previous experience in planning, fundraising, coordination, implementation of the restoration of the Fairmount Water Works.

- PROJECT ARCHITECT, FWW Feasibility Study 1978-79 • develop hydro & restaurant restoration/maintenance standards for City RFP's (1986?)
- " " , Cactaria's Hse Restoration 1983
- Member Steering Committee, 1983-1986 (?)
- Principal-in-Charge, Old Mill House restoration 1985-87
- " " " , Engine House Deck " 1988-89

B. Documentary resources. The Water Department has provided copies of drawings, photographs and reports in its files, including 1978 HAER measured drawings; 1928 and 1984 sewer and utility drawings; 1981 Adaptive Use Feasibility Study of John Milner Associates; 1986 Design for an Interpretive Center by Matheu Cebul & Associates; historic photographs in Water Department files. From Fairmount Park files, prints of historic 1913 and 1923 site plans and the photogrammetric map have been assembled. Team researchers from Clio Group, Inc. expect to review the records of the historic libraries and archives in the city. If you are aware of other historic descriptions and/or views, historic site or garden plans, street or landscape drawings, or other sources, please list them below.

We have a modest collection of historic views in our Arch Street Office, which you are welcome to review. Also, Historical Commission has files.

C. Of what proposed future plans should we be aware for traffic, street, utility, pedestrian uses adjacent to the site, including Kelly Drive, Spring Garden Street bridge, West River Drive bridge, Philadelphia Art Museum driveway?

unknown, beyond restaurant and interpretive center proposals

## II. VIEWS AND OPINIONS

A. What do you see as the primary objectives for the site? (tourist attraction, historic restoration, recreation, cultural exhibit, income generation, occupancy of vacant buildings, other?)

all of the above

B. What do you see as the major restoration objectives for the site? What role should the Forebay serve at the site? (recreation, part of interpretive exhibit, park restoration, control of movement through site, other?)

EXCAVATION OF Forebay is vital component of interpretation of site which may also assist in solving difficult restaurant-related vehicular access problems. Also note: Forebay wall was not damproofed or repointed as part of the Old Mill House project, in anticipation of EXCAVATION of Forebay. For use of interior of " " " , if Forebay is not EXCAVATED, rehabilitation of exterior of Forebay wall must nevertheless occur.

C. In the best possible world, describe how you believe the Forebay, bridge, Aquarium Drive and other vehicular and pedestrian access would work in the restored site.

### Possible Components

- Forebay wall exposed as low as possible (though there is a question of exposure to the public the arched openings which historically were below water level)
- Balustrade reinstalled along Forebay wall and, where possible, atop exposed Forebay bridge
- expose Forebay bridge at least to water line
- reroute bike/jogger path so excavation can extend to the cliff?
- control but allow vehicular access

D. What constraints would make it difficult to achieve the restoration described in question II.C. above? (For example, your concerns about the reintroduction of water into the Forebay, restaurant delivery and trash disposal needs, etc.)

- nature of distribution of parking for restaurant, interpretive center, general site visitation.
- despite new Old Mill House Forebay wall buttresses, reintroduction of water might raise a host of engineering issues.
- trash removal has to be strictly controlled, as does delivery. Minimize access times, vehicle sizes?

E. Explain advantages of the ideal you described in II.C above.

interpretation, architectural integrity, public understanding of a major landmark,...

F. Explain disadvantages of the ideal you described in II.C above.

vehicular access will not be easy, though the same would be true if Forebay was not excavated.

G. Do you think that limiting vehicular access to the Forebay and Aquarium Drive would enhance the site's historic character? \_\_\_\_\_

...would detract from its use by the public? \_\_\_\_\_

Explain your thinking.

"limiting" is vague. Do you mean eliminating?

FAIRMOUNT WATER WORKS FOREBAY SCHEMATIC STUDY QUESTIONNAIRE

I. BACKGROUND AND PROJECT PROGRAM

A. Describe your affiliation, role and previous experience in planning, fundraising, coordination, implementation of the restoration of the Fairmount Water Works.

*Architect for the schematic design phase of the  
Interpretive Center for the Fairmount Waterworks*

B. Documentary resources. The Water Department has provided copies of drawings, photographs and reports in its files, including 1978 HAER measured drawings; 1928 and 1984 sewer and utility drawings; 1981 Adaptive Use Feasibility Study of John Milner Associates; 1986 Design for an Interpretive Center by Matheu Cebul & Associates; historic photographs in Water Department files. From Fairmount Park files, prints of historic 1913 and 1923 site plans and the photogrammetric map have been assembled. Team researchers from Clio Group, Inc. expect to review the records of the historic libraries and archives in the city. If you are aware of other historic descriptions and/or views, historic site or garden plans, street or landscape drawings, or other sources, please list them below.

C. Of what proposed future plans should we be aware for traffic, street, utility, pedestrian uses adjacent to the site, including Kelly Drive, Spring Garden Street bridge, West River Drive bridge, Philadelphia Art Museum driveway?

ECEN.

DEC 15 1986

## II. VIEWS AND OPINIONS

A. What do you see as the primary objectives for the site? (tourist attraction, historic restoration, recreation, cultural exhibit, income generation, occupancy of vacant buildings, other?)

historic restoration | cultural attraction

B. What do you see as the major restoration objectives for the site? What role should the Forebay serve at the site? (recreation, part of interpretive exhibit, park restoration, control of movement through site, other?)

Part of Interpretive exhibit through its  
"interpretive" restoration; should also (perhaps)  
provide additional gathering space for special events

C. In the best possible world, describe how you believe the Forebay, bridge, Aquarium Drive and other vehicular and pedestrian access would work in the restored site.

Site plans in Interpretive Center scheme

D. What constraints would make it difficult to achieve the restoration described in question II.C. above? (For example, your concerns about the reintroduction of water into the Forebay, restaurant delivery and trash disposal needs, etc.)

it would prevent immediately adjacent  
visitor parking to restaurant + Interpretive Center;  
restaurant delivery could probably be dealt with  
by restricting restaurant delivery + trash removal hours.  
(i.e. early morning.)

E. Explain advantages of the ideal you described in II.C above.

Unfortunately ~~the~~ By allowing the Schuykill to come back into the forebay there will probably be problems in the movement of water and the impending problems of stagnation, trash, insects, etc. I don't see an immediate or viable cost solution to bringing the forebay back to its original state. With this situation, why not take advantage of the forebay area for a gathering place while still interpreting its role in the Waterworks function.

F. Explain disadvantages of the ideal you described in II.C above.

It would be wonderful to see the forebay as it was originally designed → along with all the working machinery in the lower level.

G. Do you think that limiting vehicular access to the Forebay and Aquarium Drive would enhance the site's historic character? yes

...would detract from its use by the public? no

Explain your thinking.

Vehicles would most likely block the lovely panoramic view of pavilions that edge the forebay, and the vehicles would probably further confuse our understanding of the forebay's role in the Waterworks.

FAIRMOUNT WATER WORKS FOREBAY SCHEMATIC STUDY QUESTIONNAIRE

I. BACKGROUND AND PROJECT PROGRAM

A. Describe your affiliation, role and previous experience in planning, fundraising, coordination, implementation of the restoration of the Fairmount Water Works.

*I have served as Historian to the Water Department with respect to Fairmount Waterworks for several years*

B. Documentary resources. The Water Department has provided copies of drawings, photographs and reports in its files, including 1978 HAER measured drawings; 1928 and 1984 sewer and utility drawings; 1981 Adaptive Use Feasibility Study of John Milner Associates; 1986 Design for an Interpretive Center by Matheu Cebul & Associates; historic photographs in Water Department files. From Fairmount Park files, prints of historic 1913 and 1923 site plans and the photogrammetric map have been assembled. Team researchers from Clio Group, Inc. expect to review the records of the historic libraries and archives in the city. If you are aware of other historic descriptions and/or views, historic site or garden plans, street or landscape drawings, or other sources, please list them below.

C. Of what proposed future plans should we be aware for traffic, street, utility, pedestrian uses adjacent to the site, including Kelly Drive, Spring Garden Street bridge, West River Drive bridge, Philadelphia Art Museum driveway?

*no knowledge*

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THOMAS & NEWSWANDER  
ARCHITECTS

## II. VIEWS AND OPINIONS

A. What do you see as the primary objectives for the site? (tourist attraction, historic restoration, recreation, cultural exhibit, income generation, occupancy of vacant buildings, other?)

Restoring the waterworks to its former place as an icon of Philadelphia, making it a "must see" for tourists as well as informing visitors of the specific activities & technology at the site and its importance to the city.

B. What do you see as the major restoration objectives for the site? What role should the Forebay serve at the site? (recreation, part of interpretive exhibit, park restoration, control of movement through site, other?)

See A.  
Forebay as part of interpretive exhibit

C. In the best possible world, describe how you believe the Forebay, bridge, Aquarium Drive and other vehicular and pedestrian access would work in the restored site.

Visitors to cross bridge to reach site.  
Vehicles are a problem for you to solve.

D. What constraints would make it difficult to achieve the restoration described in question II.C. above? (For example, your concerns about the reintroduction of water into the Forebay, restaurant delivery and trash disposal needs, etc.)

I can see that water in the Forebay would make the site more logical to the visitor. I do not know how you would handle restaurant delivery & trash disposal, etc.

E. Explain advantages of the ideal you described in II.C above.

The site originally had water in the Forebay and water alongside New Mill House. Water in the Forebay at least would make it easier to explain the flow of water through the <sup>old</sup> Mill House.

F. Explain disadvantages of the ideal you described in II.C above.

Access to the Engine House + Restaurant ~~as well as this~~ I would be seriously curtailed.

G. Do you think that limiting vehicular access to the Forebay and Aquarium Drive would enhance the site's historic character? NO

...would detract from its use by the public? Yes

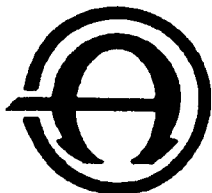
Explain your thinking.

Do you mean all of Aquarium Drive, or only from the Italian Fountain? The public does not like to park a great distance away, especially if it is a restaurant. I think controlled vehicular traffic at Forebay would be good (specific delivery trucks, etc.) (maybe Valet Parking?) if it is not full of water.

X. SUPPLEMENT: DOCUMENTATION  
FOR EXCAVATED FOREBAY

- A. Structural Evaluation of Forebay and Bridge
- B. Outline Scope of Work
- C. Retaining Wall: Section A
- D. Specification for Excavation
- E. Specification for Seeding
- F. Excavation Grading Plan (unbound insert):  
site services by Ang Associates, Inc.  
and grading by Hexagon Limited

- A. STRUCTURAL EVALUATION OF  
FOREBAY AND BRIDGE
- B. OUTLINE SCOPE OF WORK
- C. RETAINING WALL: SECTION A



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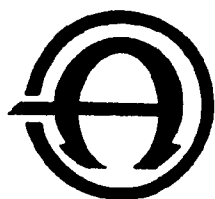
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(215) 923-7010 • Fax #: (215) 923-7080

### FAIRMOUNT WATER WORKS FOREBAY FEASIBILITY STUDY

#### **Structural Evaluation:**

**Old Mill House Wall** - The wall is of stone construction approximately four (4) feet in thickness. It was reinforced from inside of the Mill House with buttress walls to resist hydrostatic pressure from a 100 year flood level in the forebay area. A portion of the wall facing the forebay area can be seen inside the underground Forebay Room. The wall in general is in good condition. When the entire wall is exposed after the forebay area is excavated, it should be inspected by an engineer for its structural integrity. The wall should be cleaned and the mortar joints repointed as required.

**Bridge** - The existing bridge is a 3-arch stone bridge. Part of the arches next to the Mill House are exposed inside the underground Forebay Room. A concrete retaining wall was constructed on the north side of the bridge when the forebay was filled in. The exposed portion of the bridge is in good condition. When the entire bridge is exposed, it should be inspected by an engineer for its structural integrity. It is expected that with some cleaning and repointing, the bridge may be able to support occasional trucks for servicing.



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### FAIRMOUNT WATER WORKS FOREBAY FEASIBILITY STUDY

#### Outline Scope of Work:

##### (1) Civil/Structural:

###### A. Removal:

1. Existing Aquarium Drive roadway
2. Retaining wall north of bridge
3. Underground Forebay Room
4. Misc. stone wall

###### B. New Work:

1. Driveway with unit pavers
2. Retaining walls
3. Stairs
4. Fill in existing opening to underground Forebay Room
5. Cleaning and repointing of existing stone wall and bridge

##### (2) Drainage:

###### A. Removal:

1. 6 or 7 storm inlets in the existing roadway
2. 3 storm inlets in a swale east of the west forebay wall
3. 3 or 4 sewer manholes
4. Related pipings

###### B. New Work:

1. Catch basin and sewer connection
2. Drainage system for new driveway

##### (3) Water:

###### A. Removal:

1. At least 2 water main manholes
2. At least 2 water valve boxes
3. 1 fire hydrant

###### B. New Work:

1. Relocate water main below finish grade
2. Relocate fire hydrant

(4) Electrical

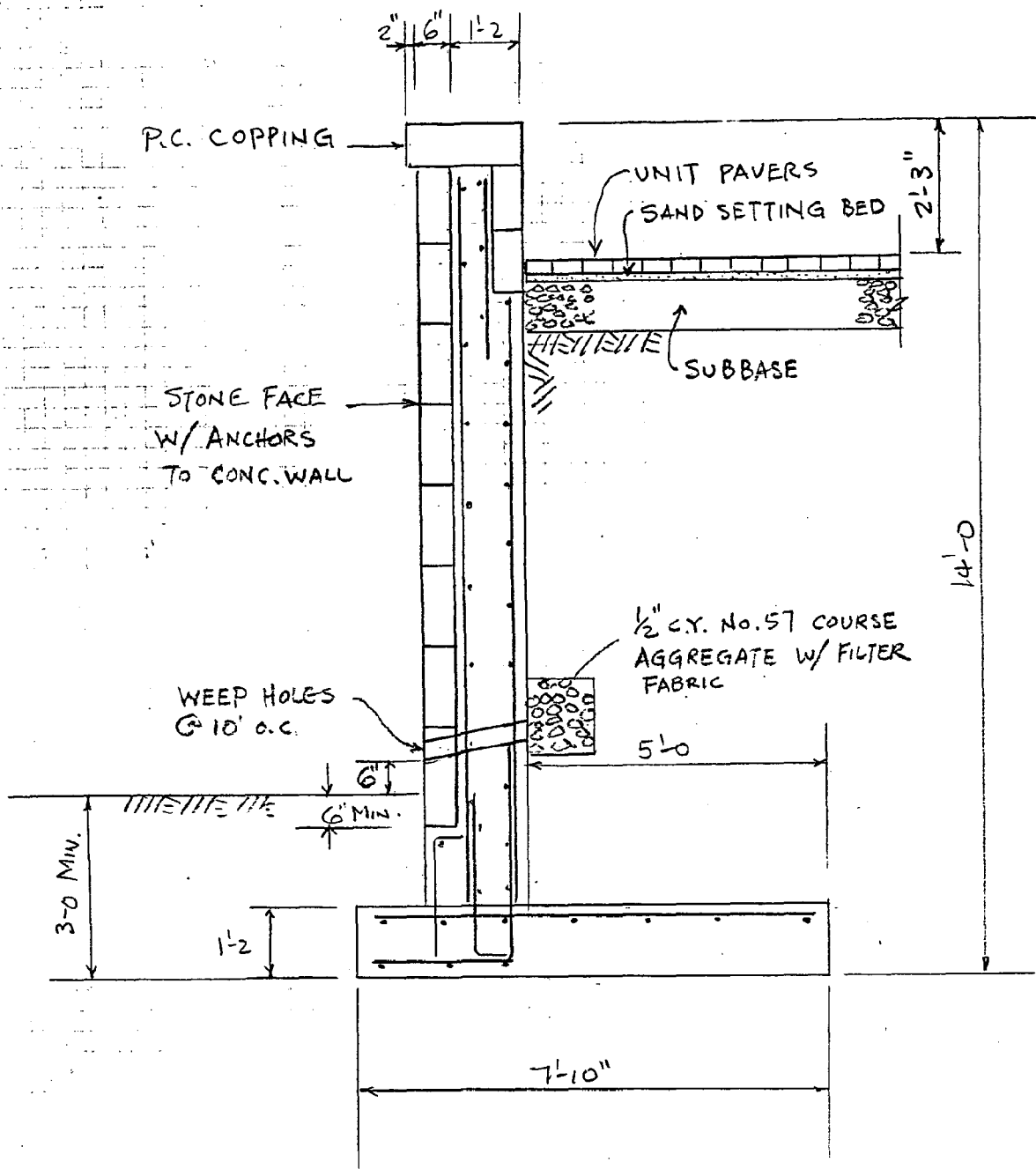
Incoming power service will be relocated by PECO, and the new transformer will be relocated by the new tenant of the building.

A. Removal:

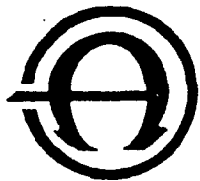
1. Light poles
2. Transformer vault

B. New Work:

1. Lighting for new driveway
2. Site lighting



SECTION A



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PROJECT WATER WORK FOREBAY

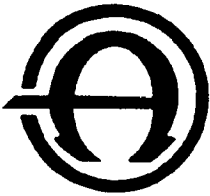
JOB NO. \_\_\_\_\_ SHEET NO. \_\_\_\_\_ OF \_\_\_\_\_

CALCULATED BY \_\_\_\_\_ DATE \_\_\_\_\_

CHECKED BY \_\_\_\_\_ DATE \_\_\_\_\_

SCALE 3/8" = 1'-0"

D. SPECIFICATION FOR  
EXCAVATION



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### SECTION 02200 - EARTHWORK

#### PART 1 - GENERAL

##### 1.01 RELATED DOCUMENTS

- A. Drawings, standard contract requirements, special provisions and Division-1 Specification sections, apply to work of this section.

##### 1.02 DESCRIPTION OF WORK

- A. Extent of earthwork is indicated on Contract Drawings.
  - 1. Preparation of subgrade for retaining walls, stairs, walks, and pavements is included as part of this work.
  - 2. Backfilling of trenches for plumbing work shall be the responsibility of the Plumbing Contractor.
- B. Excavation for Plumbing Work: Refer to Division 15 section for excavation and plumbing backfill required in conjunction with underground utilities and buried appurtenances; not work of this section.
- C. Definitions: "Excavation" consists of removal of material encountered to subgrade elevations indicated and subsequent disposal of materials removed.
- D. In addition to excavation to subgrade, Contractor shall provide all excavation to verify existing arch bridge and underground utility locations in preparation for site work. This work shall be performed at no additional cost to the Owner.

##### 1.03 QUALITY ASSURANCE

- A. Codes and Standards: Perform excavation work in compliance with applicable requirements of governing authorities having jurisdiction.

EARTHWORK  
02200-1

B. Testing and Inspection Service:

1. Employ, at Contractor's expense, testing laboratory to perform soil testing and inspection service for quality control testing during earthwork operations.

1.04 SUBMITTALS

A. Test Reports-Excavating: Submit following reports directly to Architect from the testing services, with copy to Contractor:

1. Verification of each footing subgrade.
2. Field density test reports.
3. One optimum moisture-maximum density curve for each type of soil encountered.

1.05 JOB CONDITIONS

A. Site Information: Data on subsurface conditions are not available. Additional test borings and other exploratory operations may be made by Contractor at no cost to Owner.

B. Existing Utilities:

1. Locate existing underground utilities in areas of work. If utilities are to remain in place, provide adequate means of support and protection during earthwork operations.
2. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult utility owner immediately for directions. Cooperate with Owner and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of utility owner.
3. Do not interrupt existing utilities serving facilities occupied and used by Owner or others, during occupied hours, except when permitted in writing by Architect and then only after acceptable temporary utility services have been provided.
  - a. Provide minimum of 48-hour notice to Architect/Engineer, and receive written notice to proceed before interrupting any utility.

4. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies for shut-off of services if lines are active.
- C. Use of Explosives: The use of explosives is not permitted.
- D. Protection of Persons and Property:
1. Barricade open excavations occurring as part of this work and post with warning lights.
    - a. Operate warning lights as recommended by authorities having jurisdiction.
  2. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations.

## PART 2 - PRODUCTS

### 2.01 SOIL MATERIALS

#### A. Definitions:

1. Satisfactory soil materials are defined as those complying with ASTM D2487 soil classification groups GW, GP, GM, SM, SW and SP.
2. Unsatisfactory soil materials are defined as those complying with ASTM D2487 soil classification groups GC, SC, ML, MH, CL, CH, OL, OH and PT.
3. Subbase Material: Material for Subbase Course shall conform to the requirements of, and be in accordance with, Pennsylvania Department of Transportation Specifications, Publication (Pub. 408), Section 350 "Subbase".
4. Drainage Fill: Material for drainage fill shall be No. 57 stone conforming to the requirements of AASHTO M43 (ASTM D448).
5. Backfill and Fill Materials:
  - a. Satisfactory soil materials free of clay, rock or gravel larger than 2" in any

dimension, debris, waste, frozen materials, vegetable and other deleterious matter.

### PART 3 - EXECUTION

#### 3.01 EXCAVATION

A. **Excavation Classifications:** The following classifications of excavation will be made when rock excavation is encountered in work:

1. Earth excavation includes excavation of pavements and other obstructions visible on ground surface; underground structures, utilities and other items indicated to be demolished and removed; together with earth and other materials encountered that are not classified as rock or unauthorized excavation.
2. Rock excavation in trenches and pits includes removal and disposal of materials and obstructions encountered which cannot be excavated with a 1.0 cu yd (heaped) capacity, 42' wide bucket on track-mounted power excavator equivalent to Caterpillar Model 215, rated at not less than 90 hp flywheel power and 30,000-lb drawbar pull. Trenches in excess of 10'-0" in width and pits in excess of 30'-0" in either length or width are classified as open excavation.
3. Rock excavation in open excavations includes removal and disposal of materials and obstructions encountered which cannot be dislodged and excavated with modern track-mounted heavy-duty excavating equipment without drilling, blasting or ripping. Rock excavation equipment is defined as Caterpillar Model No. 973 or No. 977K, or equivalent track-mounted loader, rated at not less than 170 hp flywheel power and developing 40,000-lb break-out force (measured in accordance with SAE J732C).
4. Typical of materials classified as rock are boulders 1/2 cu yd or more in volume, solid rock, rock in ledges, and rock-hard cementitious aggregate deposits.
5. Intermittent drilling, blasting or ripping performed to increase production and not

necessary to permit excavation of material encountered will be classified as earth excavation.

6. Do not perform rock excavation work until material to be excavated has been cross-sectioned and classified by Architect/Engineer. Such excavation will be paid on basis of contract conditions relative to changes in work.
7. Rock payment lines are limited to the following:
  - a. 2' outside of concrete work for which forms are required, except footings.
  - b. 1' outside perimeter of footings.
  - c. In pipe trenches, 6" below invert elevation of pipe and 2' wider than inside diameter of pipe, but not less than 3' minimum trench width.
  - d. Neat outside dimensions of concrete work where no forms are required.
  - e. Under slabs on grade, 6" below bottom of concrete slab.
- B. Unauthorized excavation consists of removal of materials beyond indicated subgrade elevations or dimensions without specific direction of Architect/Engineer. Unauthorized excavation, as well as remedial work directed by Architect, shall be at Contractor's expense.
  1. Under footings, foundation bases, or retaining walls, fill unauthorized excavation by extending indicated bottom elevation of footing or base to excavation bottom, without altering required top elevation. Lean concrete fill may be used to bring elevations to proper position, when acceptable to Engineer.
  2. Elsewhere, backfill and compact unauthorized excavations as specified for authorized excavations of same classification, unless otherwise directed by Engineer.

C. Stability of Excavations:

1. Slope sides of excavations to comply with local codes and ordinances having jurisdiction. Shore and brace where sloping is not possible because of space restrictions or stability of material excavated.
2. Maintain sides and slopes of excavations in safe condition until completion of backfilling.

D. Dewatering:

1. Prevent surface water and subsurface or ground water from flowing into excavations and from flooding project site and surrounding area.
2. Do not allow water to accumulate in excavations. Remove water to prevent softening of foundation bottoms, undercutting footings, and soil changes detrimental to stability of subgrades and foundations. Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations.
3. Establish and maintain temporary drainage ditches and other diversions outside excavation limits to convey rain water and water removed from excavations to collecting or run-off areas. Do not use trench excavations as temporary drainage ditches.

E. Material Storage:

1. Stockpile satisfactory excavated materials where directed, until required for backfill or fill. Place, grade and shape stockpiles for proper drainage.
2. Locate and retain soil materials away from edge of excavations.
3. Dispose of excess soil material and waste materials as herein specified.

F. Excavation for Structures:

1. Conform to elevations and dimensions shown within a tolerance of plus or minus 0.10', and extending a sufficient distance from

footing and foundations to permit placing and removal of concrete formwork, installation of services, other construction, and for inspection.

2. In excavating for footings and foundations, take care not to disturb bottom of excavation. Excavate by hand to final grade just before concrete reinforcement is placed. Trim bottoms to required lines and grades to leave solid base to receive other work.
- G. Excavation to Expose Existing Arch Bridge and Forebay Wall: Take care not to damage the existing bridge and Forebay wall. Excavate to within two (2) feet of the existing structures by machine. Remaining excavations, including those under the arches, to be done by hand.
- H. Excavation for Pavements: Cut surface under pavements to comply with cross-sections, elevations and grades as shown.
- I. Excavation for Trenches:
1. Dig trenches to the uniform width required for particular item to be installed, sufficiently wide to provide ample working room. Provide 6" to 9" clearance on both sides of pipe or conduit.
  2. Excavate trenches to depth indicated or required. Carry depth of trenches for piping to establish indicated flow lines and invert elevations. Beyond building perimeter, keep bottoms of trenches sufficiently below finish grade to avoid freeze-ups.
  3. For pipes or conduit 5" or less in nominal size and for flat-bottomed multiple-duct conduit units, do not excavate beyond indicated depths. Hand excavate bottom cut to accurate elevations and support pipe or conduit on undisturbed soil.
  4. For pipes or conduit 6" or larger in nominal size, tanks and other mechanical/electrical work indicated to receive subbase, excavate to subbase depth indicated, or, if not otherwise indicated, to 6" below bottom of work to be supported.

5. Except as otherwise indicated, excavate for exterior water-bearing piping (water, steam, condensate, drainage) so top of piping is not less than 3'-6" below finished grade.
6. Grade bottoms of trenches as indicated, notching under pipe bells to provide solid bearing for entire body of pipe.
7. Backfill trenches with concrete where trench excavations pass within 18" of column or wall footings and which are carried below bottom of such footings, or which pass under wall footings. Place concrete to level of bottom of adjacent footing.
  - a. Concrete is specified in Division-3.
8. Do not backfill trenches until tests and inspections have been made and backfilling authorized by Engineer. Use care in backfilling to avoid damage or displacement of pipe systems.
9. For piping or conduit less than 2'-6" below surface of roadways, provide 4" thick concrete base slab support. After installation and testing of piping or conduit, provide minimum 4" thick encasement (sides and top) of concrete prior to backfilling or placement of roadway subbase.
10. Cold Weather Protection: Protect excavation bottoms against freezing when atmospheric temperature is less than 35 degrees F (1 degrees C).

### 3.02 COMPACTION

- A. General: Control soil compaction during construction providing minimum percentage of density specified for each area classification as indicated below.
- B. Percentage of Maximum Density Requirements: Compact soil to not less than the following percentages of maximum density as determined in accordance with ASTM D 1557.
  1. Structures, Building Slabs and Steps: Compact top 12" of subgrade and each layer of backfill or fill material at 98% maximum density.

2. Pavements: Compact top 6" of subgrade and each layer of backfill or fill material at 98% maximum density.

C. Moisture Control:

1. Where subgrade or layer of soil material must be moisture conditioned before compaction, uniformly apply water to surface of subgrade, or layer of soil material, to prevent free water appearing on surface during or subsequent to compaction operations.
2. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density.
3. Soil material that has been removed because it is too wet to permit compaction may be stockpiled or spread and allowed to dry. Assist drying by discing, harrowing or pulverizing until moisture content is reduced to a satisfactory value.

3.03 BACKFILL AND FILL

- A. General: Place acceptable soil material in layers to required subgrade elevations, for each area classification listed below. All excavated material found to be unsuitable for backfill shall be disposed of on airport property. Such material shall also be graded as directed by the Owner. All rubble and debris shall be legally disposed of off airport property.
  1. In excavation in general areas use satisfactory excavated or borrow material.
  2. Under walks and pavements, use subbase material.
  3. Under steps, use subbase material.
  4. Under piping and conduit, use subbase material where subbase is indicated under piping or conduit; shape to fit bottom 90 degrees of cylinder.
- B. Backfill excavations as promptly as work permits, but not until completion of the following:
  1. Acceptance of construction below finish grade including, where applicable, dampproofing, waterproofing, and perimeter insulation.

2. Inspection, testing, approval, and recording locations of underground utilities.
  3. Removal of concrete formwork.
  4. Removal of shoring and bracing, and backfilling of voids with satisfactory materials. Cut off temporary sheet piling driven below bottom of structures and remove in manner to prevent settlement of the structures or utilities, or leave in place if required.
  5. Removal of trash and debris.
- C. Ground Surface Preparation: Remove vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placement of fills. Plow, strip, or break-up sloped surfaces steeper than 1 vertical to 4 horizontal so that fill material will bond with existing surface.

When existing ground surface has a density less than that specified under "Compaction" for particular area classification, break up ground surface, pulverize, moisture-condition to optimum moisture content, and compact to required depth and percentage of maximum density.

- D. Placement and Compaction: Place backfill and fill materials in layers not more than 8" in loose depth for material compacted by heavy compaction equipment, and not more than 4" in loose depth for material compacted by hand-operated tampers.

Before compaction, moisten or aerate each layer as necessary to provide optimum moisture content. Compact each layer to required percentage of maximum dry density or relative dry density for each area classification. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.

Place backfill and fill materials evenly adjacent to structures, piping or conduit to required elevations. Take care to prevent wedging action of backfill against structures or displacement of piping or conduit by carrying material uniformly around structure, piping or conduit to approximately same elevation in each lift.

### 3.04 GRADING

- A. General: Uniformly grade areas within limits of grading under this section, including adjacent transition areas. Smooth finished surface within specified tolerance, compact with uniform levels or slopes between points where elevations are indicated, or between such points and existing grades.
- B. Grading Outside Building Lines: Grade areas adjacent to building lines to drain away from structures and to prevent ponding.
  - 1. Lawn or Unpaved Areas: Finish areas to receive topsoil to within not more than 0.10' above or below required subgrade elevations.
  - 2. Walks: Shape surface of areas under walks to line, grade and cross-section, with finish surface not more than 0.10' above or below required subgrade elevation.
  - 3. Pavements: Shape surface of areas under pavement to line, grade cross-section, with finish surface not more than 1/2" above or below required subgrade elevation.
- C. Compaction: After grading, compact subgrade surfaces to the depth and indicated percentage of maximum or relative density for each area classification.

### 3.05 PAVEMENT SUBBASE COURSE

- A. General: Subbase course consists of placing subbase material, in layers or specified thickness, over subgrade surface to support a pavement base course.
  - 1. See other Division-2 sections for paving specifications.
- B. Grade Control: During construction, maintain lines and grades including crown and cross-section of subbase course.
- C. Placing: Place subbase course material on prepared subgrade in layers of uniform thickness, conforming to indicated cross-section and thickness. Maintain optimum moisture content for compacting subbase material during placement operations.

- D. When a compacted subbase course is shown to be 6" thick or less, place material in a single layer. When shown to be more than 6" thick, place material in equal layers, except no single layer more than 6" or less than 3" in thickness when compacted.

### 3.06 FIELD QUALITY CONTROL

- A. Quality Control Testing During Construction: Allow testing service to inspect and approve subgrades and fill layers before further construction work is performed.
  - 1. Perform field density tests in accordance with ASTM D 1556 (sand cone method) or ASTM D 2167 (rubber balloon method), as applicable, or by nuclear method.
- B. Paving Areas: Make at least one field density test of subgrade for every 2000 sq. ft. of paved area or building slab, but in no case less than 3 tests. In each compacted fill layer, make one field density test for every 2000 sq. ft. of overlaying building slab or paved area, but in no case less than 3 tests.
- C. Foundation Wall Backfill: Take at least 2 field density tests, at locations and elevations as directed.
- D. If in opinion of Engineer, based on testing service reports and inspection, subgrade or fills which have been placed are below specified density, provide additional compaction and testing at no additional expense.

### 3.07 MAINTENANCE

- A. Protection of Graded Areas: Protect newly graded areas from traffic and erosion. Keep free of trash and debris.

Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.
- B. Reconditioning Compacted Areas: Where completed areas are disturbed by subsequent construction operations or adverse weather, scarify surface, re-shape and compact to required density prior to further construction.

E. SPECIFICATION FOR  
SEEDING



## FAIRMOUNT WATER WORKS FOREBAY RESTORATION

### SEED SPECIFICATION

#### 1. GRASS SEED MIXTURE

- a. Grass seed shall be fresh, recleaned seed of the latest crop, conforming to the current purity and germination standards of the Atlantic Seedman's Association, and mixed in the following proportions by weight:

- (1) 60% Nassau Kentucky Bluegrass
- (2) 20% Jamestown Chewings Fescue
- (3) 20% Palmer Perennial Rye

The rate of seeding shall be 4 lbs/1000 s.f. The seeding times shall be April 1-May 31 and August 16-October 15.

#### 2. SOD MIXTURE

- a. Sod shall be cultivated sod, predominately 50% Nassau Kentucky Bluegrass and 50% of the three following Kentucky Bluegrasses: Ram I, Georgetown, Barron, Princeton (104), or 1757; min. 2 years old, and reasonably free of weeds and undesirable grasses. Sod shall be cut in strips, minimum 12 in. wide, and 3/4 in. thick.

#### 3. WILDFLOWER SEED MIXTURE

- a. Wildflower seed mixture shall be the low-growing mixture (less than 16 inches high) with a minimum purity of 95% and minimum germination ranges from 40%-75%. The mixture shall consist of the following:

<u>Scientific Name</u>	<u>Common Name</u>
Campanula carpatica	Tussock Bellflower
Centaurea cyanus (dwarf)	Dwarf Cornflower
Cerastium biebersteinii	Snow-in-Summer
Cheiranthus allionii	Siberian Wallflower
Clarkia amoena	Dwarf Godetia
Coreopsis lanceolata (dwarf)	Dwarf Lance-Leaved Coreopsis
Coreopsis tinctoria (dwarf)	Dwarf Plains Coreopsis

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Fairmount Water Works Forebay  
Seed Mixtures  
Page 2

<u>Scientific Name</u>	<u>Common Name</u>
Dianthus deltoides	Maiden Pinks
Dimorphotheca surantiaca	African Daisy
Eschscholzia californica	California Poppy
Gypsophila elegans	Baby's Breath
Iberis umbellata	Candytuft
Linaria maroccana	Spurred Snapdragon
Lobularia maritima	Sweet Alyssum
Myosotis sylvatica	Forget-Me-Not
Oenothera missouriensis	Dwarf Evening Primrose
Papaver nudicaule	Iceland Poppy
Phacelia campanularia	California Bluebell
Silene armeria (dwarf)	Dwarf Catchfly
Thymus serpyllum	Creeping Thyme
Viola cornuta	Johnny Jump-Up

Seeding shall be at a rate of 4 lbs./ acre or 5 oz./ 1000 s.f. Planting shall be done in the early spring. If done in the late summer, planting shall be scheduled at least eight to nine weeks before first expected frost. Dormant seeding may be practiced in late winter. Do not seed in the late fall. At the time of seeding, the seed mix will be customized to include as many blue flowering plants as possible.

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